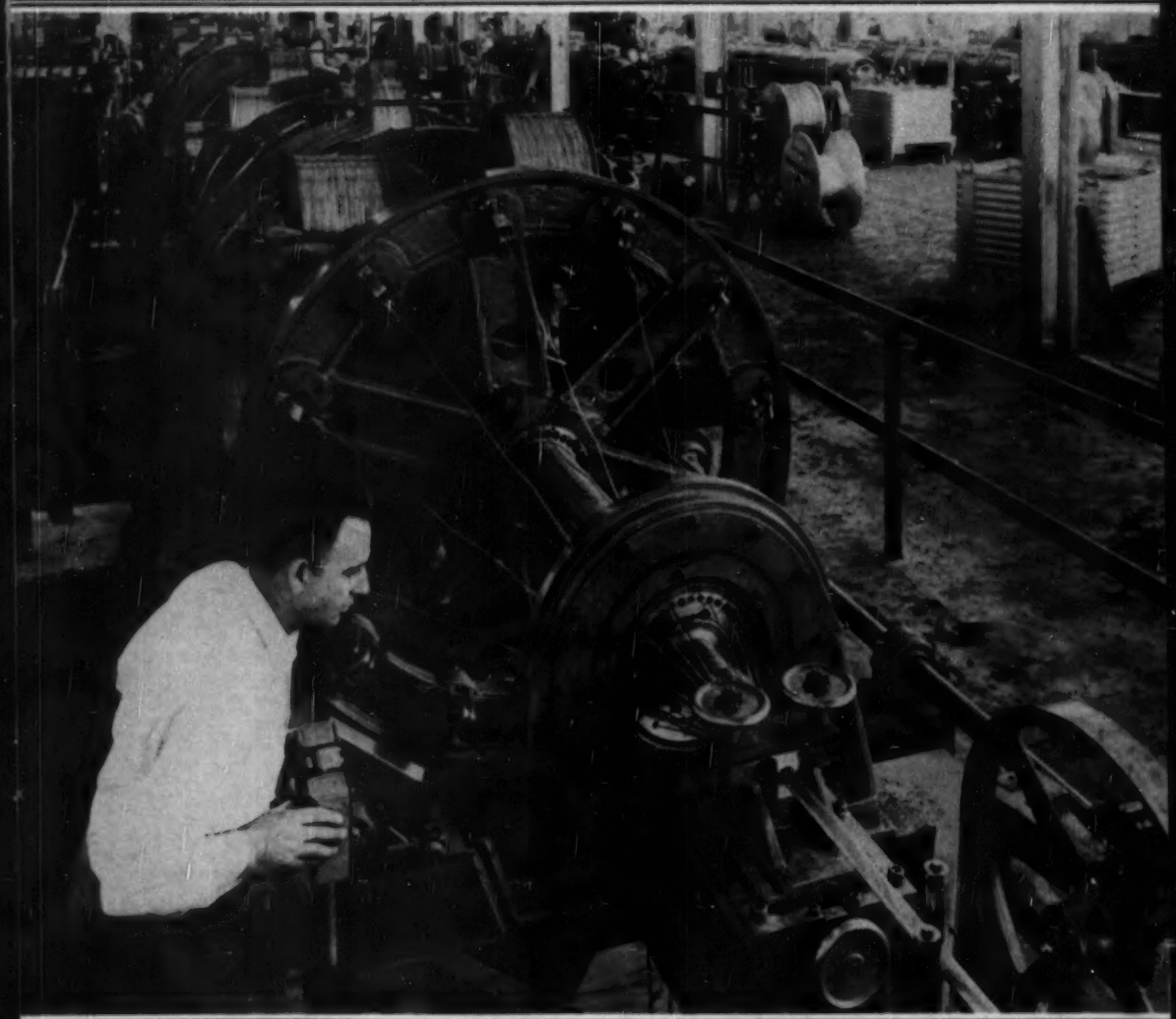
ELECTRICAL WEST

Give enough!
FOR ALL RED FEATHER SERVICES

October 1950
25 Cents



Annual Industrial Issue

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

"One is good—
two are twice as good"

"One is good, two are twice as good." That's the theme song of Edison advertising on electric ranges and water heaters. And rising sales of both appliances indicate that it's a "hit".

The fact is that electric ranges and water heaters *do* make a happy duo. They give customers twice as much comfort, convenience and economy — and they give dealers approximately twice as many prospects for profitable sales.

A song which works out that way is well worth singing. So all over Central and Southern California, electrical appliance dealers are taking their cue from Edison advertising and joining in the chorus. Edison tells them, and the dealer sells them!

SOUTHERN CALIFORNIA EDISON COMPANY

Edison

Voltage regulation costs less than new copper

The simplest, least expensive way to keep voltages up for rural customers is by using voltage regulators out along the feeders, without adding new copper. Supplementary regulation maintains proper voltage regardless of load. Revenue goes up; complaints go down.

General Electric's ML-8 is a service-proved regulator built specifically for rural lines. It provides 10% automatic voltage regulation, in eight 1¼% steps. It brings you complete reliability, minimum maintenance—*at the lowest price for any regulator.*

Booklet GEA-5417 gives full information. Ask your local G-E office for a copy, or write to *Apparatus Dept., General Electric Company, Schenectady 5, New York.*

The ML-8 is a pole-mounted voltage regulator for circuits up to 7960 volts carrying up to 100 load amperes (to 150 for 2400-volt circuits).

It features: A shockless, snap-action Geneva-gear drive for positive positioning of contacts. An improved switching circuit, employing a bridging-reactor. The switching mechanism, complete with its operating motor, is immersed in oil.

GENERAL ELECTRIC

404-70

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

OCTOBER 1950

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright, Sixty-third year of publication

ELECTRICAL WEST

James H. McGraw (1860-1948), Founder
Curtis W. McGraw, Chairman of the Board — George C. Tenney, President and Editor
W. A. Cyr, Associate Editor — Walter C. Huston, Engineering Editor
Peggy Boyer, Assistant Editor — E. A. Belzarl, Publishing Counselor
John W. Otterson, Manager — John Coots, Typography

NEXT MONTH

An article on the new Hale steam plant of Utah Power & Light Co. will give outstanding features as well as a historical background of power development in Utah. The new dispatching center of San Diego Gas & Electric Co. will be covered with an account of this ultra modern load dispatching center.

Another article will bring out some very valuable lessons learned from the big 1950 ice storm in Vancouver, Wash. Oil circuit breaker maintenance will be discussed in detail in a piece by a Bonneville engineer. Also, in engineering there will be some valuable suggestions on pole maintenance.

In lighting and wiring there will be three features. "Do It With Relays" will show the many applications in the home that can be made with relays and low-voltage control. It shows how this can be a whole new selling field for the electrical contractor. How a Marin County school used good classroom lighting to save cutting down ornamental shade trees to let in light, will be told. There will be an example of some good lighting techniques worked out by a contractor for a jewelry store — another potential market for new business for the contractor.

The news letters will be of particular interest in these days of impending shortages and rising prices.

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Cover photo: A 61-strand cabling machine in Aluminum Co. of America's new Vancouver, Wash., mill.

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Cleveland (5)	Frank J. Seiler, 1510 Hanna Bldg.
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Why KYLE Reclosers outsell all other makes

Kyle single-phase type H and three-phase type 3H oil circuit reclosers have certain well-recognized advantages that are responsible for their wide leadership.

Kyle reclosers offer the widest choice of operating sequences. Sequences and ratings are easy to change, right in the field. Positive toggle action, fast opening and closing; do not depend on gravity; no motors or clockwork. Hydraulic mechanism is simple, trouble-free. Many safety features.

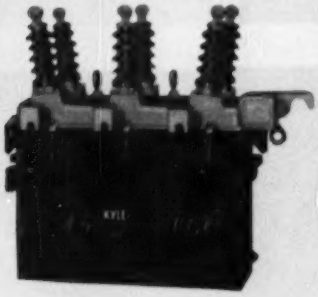
L-M offers the widest variety of reclosers. More Kyle reclosers are sold than all others, and L-M engineers have more recloser experience. Kyle reclosers are rugged, accurate, dependable. More economical to operate than fuses; their accurate coordination eliminates service calls and improves service.

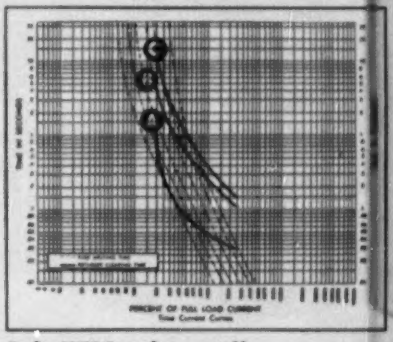
KYLE type H single-phase oil circuit recloser

Has all the Kyle safety features. Trip-free operating handle. Bushing terminals only live parts. Internal by-pass arrester. Sleet hood protects reset handle and operations counter.

KYLE type 3H three-phase oil circuit recloser

Provides individual reclosing and resetting on each phase for temporary faults; but if fault does not clear after three operations, recloser *locks out all three phases simultaneously.*





Only KYLE reclosers offer

3 operating curves, 7 sequences

Choice of three operating curves. In the chart, the time-current curves shown are A, fast operation; B, retarded operation; C, extra-retarded operation.

Choice of seven operating sequences. The following sequences can be obtained, quickly and easily, right in the field, without shop trips:

4 A's (four fast operations); 4 B's; 4 C's; 2 A's, 2 B's; 2 A's, 2 C's; 1 A, 3 B's; 1 B, 3 C's.

For 2.4 to 15 kv; six ratings from 5 to 50 amps; minimum trip currents from 10 to 100 amps; interrupting capacities from 150 to 1200 amps. Coils are quickly changed, *right in the field!*

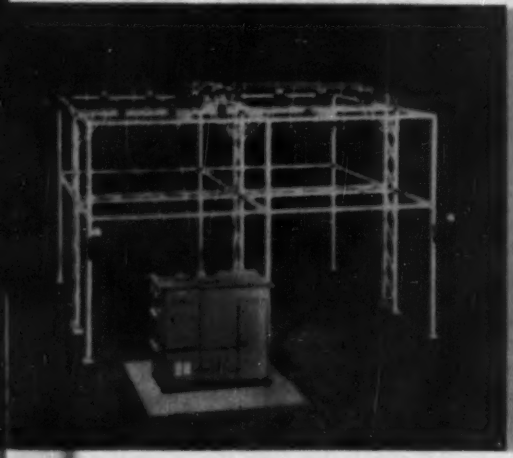
GET THE WHOLE STORY ON AUTOMATIC PROTECTION

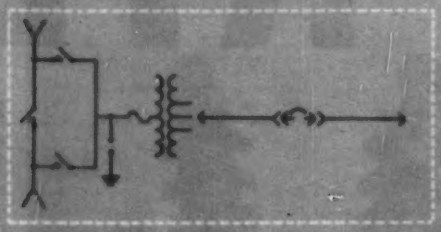
Ask the L-M Field Engineer for a copy of Recloser Bulletin CR1, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

LINE MATERIAL... Kyle Reclosers

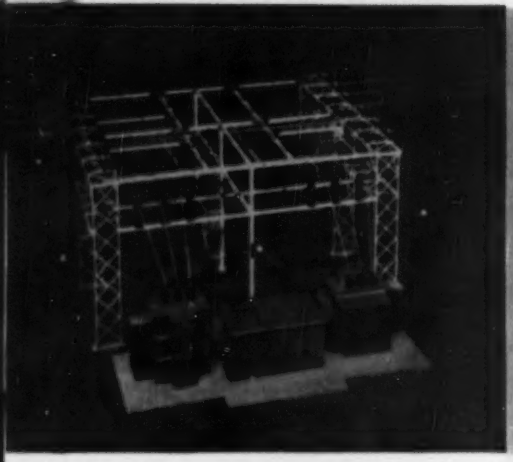
YOU CAN BE **SURE**.. IF IT'S

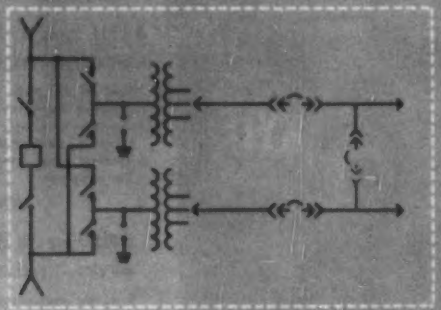
Westinghouse



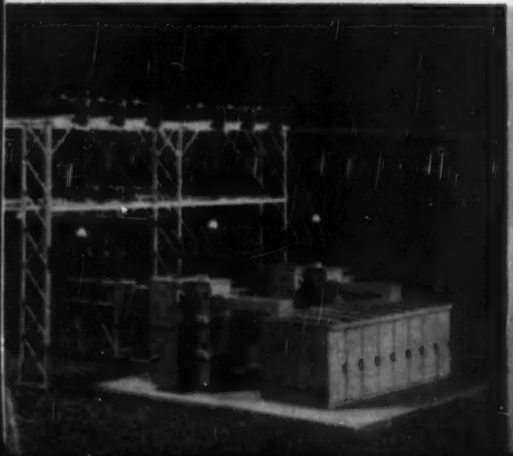


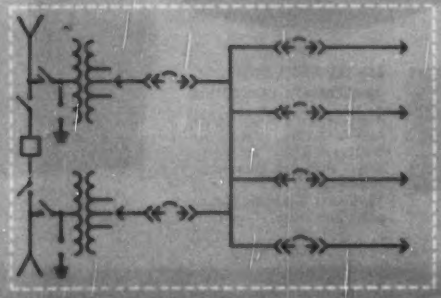
Single-feeder CSP Substation—Loop or tie subtransmission circuit—Manual sectionalization, manual selection.





Two-feeder Duplex Substation—Loop or tie subtransmission circuit—Automatic sectionalization, manual selection.

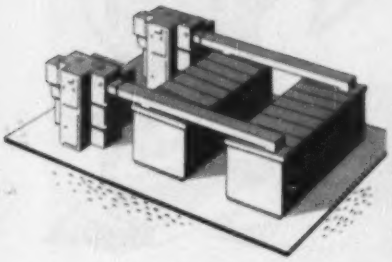




Three-or-more-feeder Spot Network Substation—Loop or tie subtransmission circuit—Automatic sectionalization.

SUBSTATIONS with A FUTURE

...lower power distribution costs



The system planning you do today must allow for future load growth, and load shifts . . . if lower power distribution costs are to be realized. The substations you choose *now* will help make this possible . . . *if they are designed with a future!*

The Westinghouse Coordinated Substations, shown here, have this "allowance for the future". They not only meet today's load demands, but provide the flexibility vital for future changes in load requirements. *They Become One of Your First Steps in Lowering Power Distribution Costs.* Their design is a result of today's modern power distribution trends. These trends are reducing distribution costs by simplifying systems and standardizing equipment. Simplifying subtransmission circuits reduces the amount of equipment used. Standardizing equipment results in production savings that are passed on to you.

Due to the compactness of these Substations, "blocks of power" can be easily and economically added or removed to take care of increased load requirements, load shifts or relocations. You realize maximum salvage value.

For more complete information, get your copy of the Coordinated Substation Book, B-4061. Ask your Westinghouse representative for it, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60728-A

Westinghouse

COORDINATED SUBSTATIONS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

Cables run COOLER...
in TRANSITE DUCTS

... reducing copper losses

... increasing current capacity

... prolonging insulation life

HERE'S HOW to reduce copper losses ... increase current carrying capacity ... and prolong insulation life—run your cables in Transite* Ducts.

Current carrying capacities can be increased in a typical duct bank as much as 5%, or I^2R losses can be reduced 11%, for cables located in Transite as compared with other ducts used for power circuits.

And, Transite Ducts assure permanent duct banks because Transite is incombustible; is immune to rust and rot; is unaffected by electrolysis; will not slag under action of an arc, and will retain its high original strength.

An unusually smooth bore assures no injury to cable sheath, either in natural movement under load, or when pulling-in cables. Long, lightweight lengths can be quickly and economically installed. In addition, a full line of fittings simplifies even the most complicated of installations.

For full information on Transite Ducts, write for Data Book DS-410. Johns-Manville, Box 290, New York 16, N. Y.

JM

*Reg. U. S. Pat. Off.

How Transite Ducts increase current carrying capacities

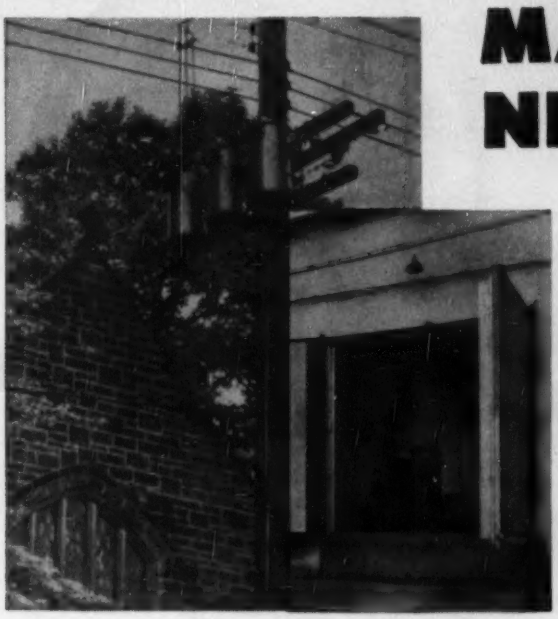
Type cable 3 cdr. 500 MCM Compact Sector, 15 KV (6th Edition AEIC Spec.)
No. of cables—3 (all loaded in one bank)
Daily Load Factor—75%
Earth Temp. ambient—20 C

	Transite	Other
Total Therm. Res. to Dielectric Loss (C watts/ft.)	5.46	6.17
Total Therm. Res. to Copper Loss (C watts/ft.)	4.44	4.95
Temp. Rise from Dielectric Loss (C)	1.9	2.1
Allowable Rise for Copper Loss (C)	59.1	58.9
Allowable Watts per ft. cable	4.44	3.96
Allowable Current—(Amps. per cdr.)	386.	365.
Allowable Current—(Relative %)	105.6	100.

Johns-Manville *Transite Ducts* "KORDUCT"—for encasement in concrete

"CONDUIT"—for use exposed and underground without encasement

Quiet Transformers MAKE GOOD NEIGHBORS!



Preparing for audible sound level test on a 1000 kva power transformer at Allis-Chalmers Pittsburgh Works sound laboratory.

Each distribution transformer design gets sound and harmonic analysis and is tested in accordance with ASA and NEMA standards.

In New Sound Laboratory Allis-Chalmers Engineers Track Down Causes of Transformer Noise.

IT'S SO QUIET in this sound laboratory you can almost hear a pin drop. The two foot walls of concrete, glass wool and acoustical tile absorb 99.98% of exterior noise power . . . keep ambient noise level down to 27 decibels.

Here, Allis-Chalmers engineers investigate audio noise, make sound level tests . . . gather data used in designing low sound level transformers. Even the most minute detail is considered. They check into core construction, clamping, ways of anchoring core and coils, location and number of accessories.

In their efforts to develop better, quieter distribution transformers, A-C engineers are working on complex problems of sound level, surge protection and construction . . . putting improved performance into every size and type. Research, engineering and production team up to give you the best in electrical design and construction.

These are a few reasons why Allis-Chalmers distribution transformers are welcome neighbors in quiet neighborhoods. For more information, contact your nearby A-C sales office, or write for specific bulletins.

Bulletin 61B7309A — ACP (Allis-Chalmers self-protected) distribution transformers to 100 kva.

Bulletin 01B6186B — General description of complete A-C power and distribution transformer line.

Bulletin 61B5726A — Rural transformers, including economical "RU" line, and ACP premium protected.

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

A-3122

ALLIS-CHALMERS

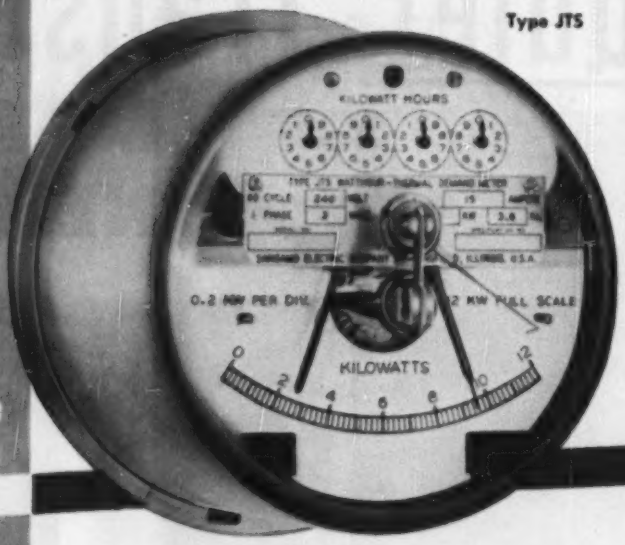
Smaller Size for Convenient Installation

in minimum space

New Sangamo Type JT

Combination Watthour-Thermal Demand Meters

Type JTS



In the new Type JT meter line, Sangamo has combined two *completely independent* elements in a single meter case that requires only the space normally provided for conventional watthour-demand meter installations. Sangamo Type JTA and Type JTS Combination Watthour-Thermal Demand Meters are designed for convenient demand measurements on all types of single-phase loads.

The watthour meter element in the new line incorporates all the service proven features of the standard Sangamo Type J Meter. The thermal meter element design is the result of many years of experience with Lincoln Thermal Demand Meters. These two elements operate completely independently of each other.

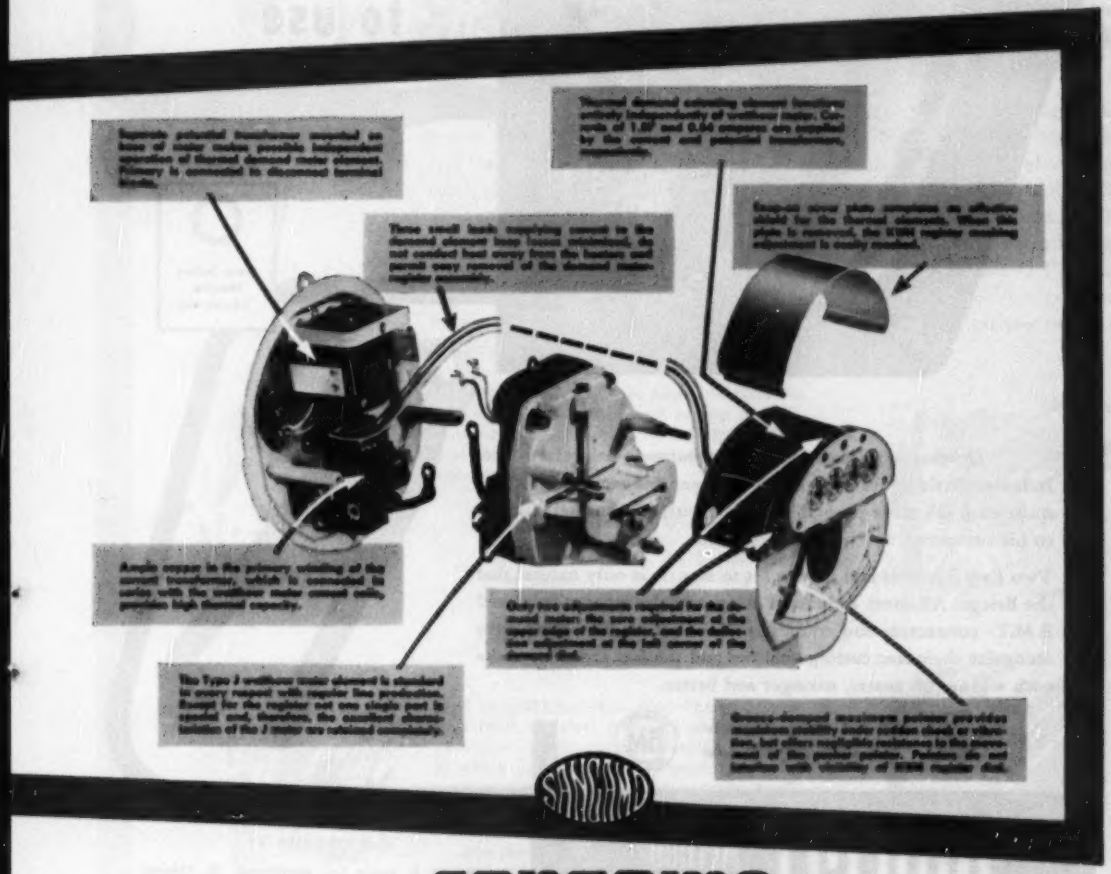
For full information, write for Bulletin 431.

Type JTA

Meter capacities for normal loads not requiring C.T.'s are 15 ampere with full scale demand of 12 KW, and 50 ampere with full scale demand of 24 KW. Full scale demand is 48 KW on meters rated 50 amperes for use with heavy duty sockets. Full scale demand is based on 240 volts. Standard capacities are available for use with current transformers.

DESIGN FEATURES

- The operation of the Type J and Lincoln meter elements are completely independent.
- Established characteristics of both the watthour meter and the demand meter are not affected through the combination of the two functions.
- Losses in leads and heaters of the thermal elements are exceptionally low because of the small current (1.8 amperes) required for full scale indication.
- Thermal element is completely shielded against external heating effects or temperature gradients within the meter.
- Frictionless, grease damped, maximum demand pointer, stabilized against motion from vibration or shock.
- Independent construction, the use of a standard J watthour meter element, and complete accessibility of all parts, including adjustments, minimizes maintenance costs.



SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

You can't buy Better Fittings or ones that cost less to use

Quicker to use and neater in appearance, Briegel All-Steel Indenter Fittings not only make stronger connections but also make each job more profitable to the contractor and satisfactory to his customers.

Two Easy Squeezes and they're set to stay. It is only natural that the Briegel All-Steel Indenter Fittings are the most widely used E.M.T. connectors and couplings. Contractors the world over recognize their cost cutting qualities and the fact that they make each wiring job neater, stronger and better.

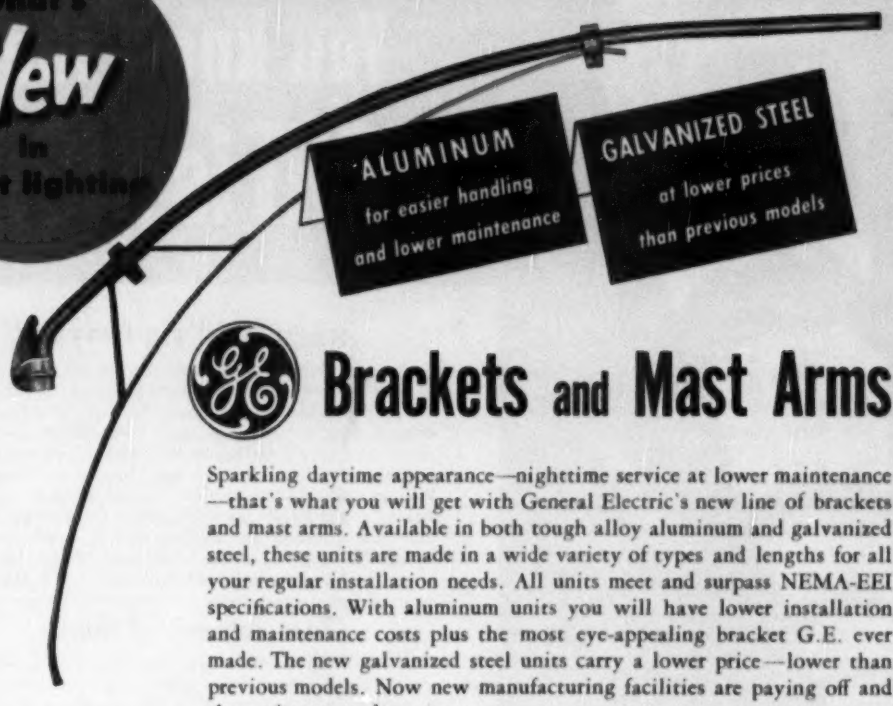
All B-M Fittings Carry the Underwriters Seal of Approval

BRIEGEL METHOD TOOL CO.
GALVA, • ILLINOIS

DISTRIBUTED BY

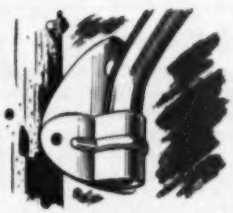
The M. B. Austin Co., Northbrook, Ill.; Clayton Mark & Co., Evanston, Ill.; Clifton Conduit Co., Jersey City, N. J.; General Electric Co., Bridgeport, Conn.; The Steelduct Co., Youngstown, Ohio; Enameled Metals, Pittsburgh, Penn.; Kondo Mfg. Co., Ltd., Preston, Ont.

what's **New** in street lighting



Brackets and Mast Arms

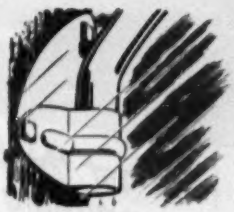
Sparkling daytime appearance—nighttime service at lower maintenance—that's what you will get with General Electric's new line of brackets and mast arms. Available in both tough alloy aluminum and galvanized steel, these units are made in a wide variety of types and lengths for all your regular installation needs. All units meet and surpass NEMA-EEI specifications. With aluminum units you will have lower installation and maintenance costs plus the most eye-appealing bracket G.E. ever made. The new galvanized steel units carry a lower price—lower than previous models. Now new manufacturing facilities are paying off and the savings passed on to you.



ONE PIECE UNIT—These new units have the bracket and pole plate all in one piece—ready to mount. There is no time lost in field assembly. Pole plates are adaptable to most poles by bolt tension.

EASIER INSTALLATION—It's a one man, one arm job with the aluminum brackets. Drive a bolt—drop the keyhole-slot of the pole plate over the bolt—it's hung. Both hands are free to tighten bolts. Steel pole plates have the same time-saving keyhole-slot. A generous radius of bend guards insulation, means easier wiring.

LESS MAINTENANCE—Hot-dipped galvanized finish on steel brackets preserves appearance and assures maximum life. Aluminum brackets combine high strength and high resistance to corrosion . . . especially in salt-spray atmospheres.



For complete details, write to Section 452-111, Apparatus Dept., General Electric Co., Schenectady 5, N. Y.

GENERAL ELECTRIC

452-111

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

You know the LIGHT is RIGHT

...when it's "via Graybar"

For street or highway, for plant or yard, for store, office, or home — when you order lighting via Graybar, you know the light will be the right kind, the right intensity, and applied right. Graybar — working with utilities, electrical contractors, and operators of industrial, commercial, and institutional establishments — has planned and supplied lighting systems of every type. Thus a Graybar Lighting Specialist can be of important help to you and your customers in planning *any* lighting system, indoor or out. In addition, with just one order to Graybar, you can also obtain all the necessary conduit, wiring, and supplies.

Fast delivery of lamps

Graybar distributes every type and size of lamp required for any lighting need. They're all G-E, so you get the best in quality and long service. To assure prompt deliveries, Graybar maintains lamp stocks at more than 100 warehouse locations throughout the nation.

Expert help on lighting

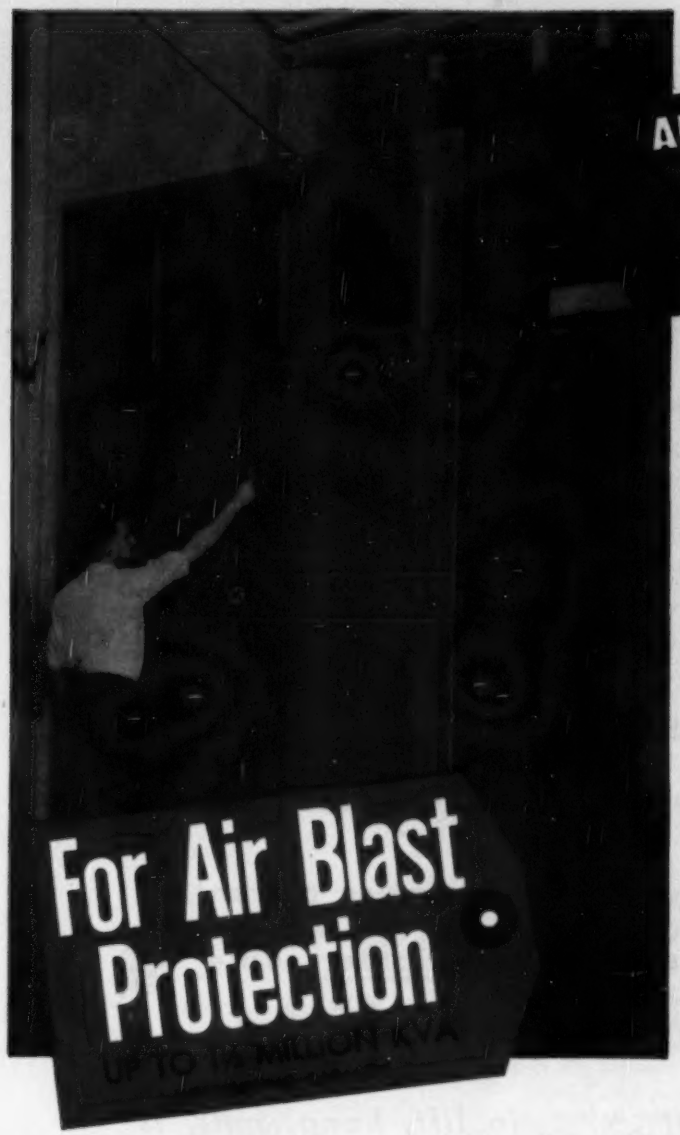
Graybar Lighting Specialists are qualified to give expert advice on fluorescent, filament, or mercury lamps and lighting units for any application. Because Graybar has the most complete selection of lamps and lighting units available from any one source, these men can impartially recommend the lighting equipment that's correct for any illumination need.

Call Graybar for Everything Electrical

Graybar distributes more than 100,000 electrical products of over 200 manufacturers—carefully selected materials, equipment, and tools for wiring, lighting, communication, power and pole-line construction. To aid fast delivery, thousands of these items are delivered from local stocks at more than 100 Graybar branch locations. This nationwide network of warehouses may be a real time-saver when you're looking for hard-to-find items or in emergencies. Graybar Specialists in various fields are on call to help you meet unusual problems. *Graybar Electric Company, Inc., Executive offices: Graybar Building, New York 17, N. Y.*

5088A

IN OVER 100 PRINCIPAL CITIES



ALLIS-CHALMERS
AB-15 Air-Blast Station Type Circuit Breaker

For Air Blast Protection

UP TO 15 MILLION KVA

SAFE

Breaker is completely oilless, housed in grounded steel cubicle. Install indoors with complete safety, no firewalls required.

FAST

Arcing time one cycle or less!

PROVEN

Ratings and performance of the AB-15 fully proved by 3 phase high interrupting capacity tests.

LOW MAINTENANCE

Negligible contact burning because of one-cycle-or-less arcing time. Entire breaker accessible through hinged doors.

FULLY PROVED, modern Allis-Chalmers Air-Blast Circuit Breakers can be supplied in ratings up to 1,500,000 kva interrupting capacity in accordance with new ASA standards.

Metal-enclosed AB-15 breakers are factory assembled — complete with station type cubicle, control equipment and breaker air storage tank — ready to install and operate.

In addition, AB-15 circuit breakers are available with segregated phase bus, group operated disconnecting switches, current transformers and auxiliary equipment — all enclosed in grounded steel cubicles.

Get more information *now* on this completely modern, oilless air blast power circuit breaker. Contact your nearby A-C sales office. A-3073

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

STANDARD RATINGS

Rated KV	Max. Design KV	Rated Amp. (60 cycle)	Interrupting Capacity KVA
14.4	15.5	1200	1,000,000
14.4	15.5	3000	1,000,000
14.4	15.5	2000	1,500,000
14.4	15.5	4000	1,500,000

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

...Your best buy

Power cable installations consist of material —

cable *conduit* *fittings* *lugs*

PLUS installation time

The MANHOURS *required per installation*

are proportional to the weight *of materials used.*

*ROCKBESTOS A.V.C.® carries more current.**

Therefore you can use <u>*smaller*</u>*—* <u>*lighter*</u> *cable*

conduit *fittings* *lugs*

The total weight *to lift, hang, pull, is*

cut 1/3 *and installation MANHOURS*

are materially reduced.

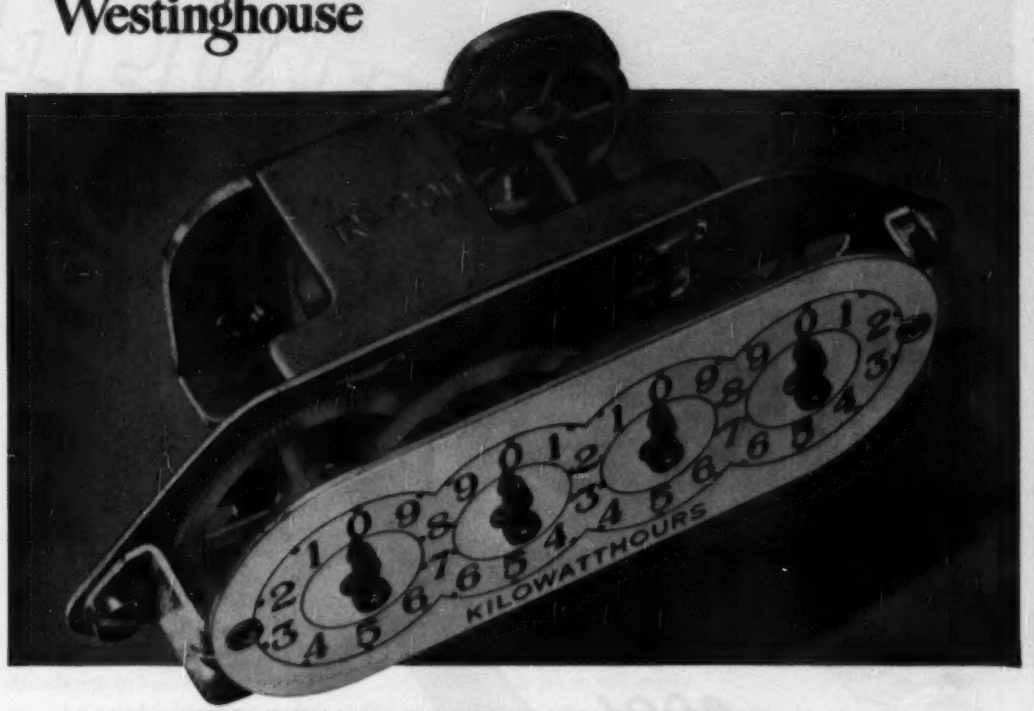
Q.E.D. ROCKBESTOS A.V.C. SAVES MANHOUR $

*National Electric Code—Chapter 10

ROCKBESTOS PRODUCTS CORPORATION

NEW HAVEN 4, CONN. New York • Cleveland
Chicago • Detroit • Pittsburgh • St. Louis • New Orleans
Los Angeles • Oakland, Calif.

YOU CAN BE SURE.. IF IT'S
Westinghouse



IT TAKES GEARS PLATED WITH GOLD

TO *Eliminate Corrosion**

Gold is doubly valuable when it protects meter gears and shafts from corrosion under all atmospheric conditions. Friction is almost negligible for life. Only Westinghouse offers this protection.

And to make doubly sure of low friction . . . involute gear teeth are *milled,* not stamped. They *roll* smooth and free. The gold finish then preserves this fine freedom of motion under all operating conditions.

What's more . . . every precision register is *self-meshing* with the disk shaft, never too tight, never too loose.

Check your meter records. They'll prove that "extras", like gears plated with gold, actually give you the greatest return on your metering investment . . . over a *long period* of years.

Get detailed information . . . ask for the new booklet, "What It Takes for Long-time, Low-cost Metering", B-4665. Call your nearest Westinghouse office or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. J-40367

Westinghouse
METERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

*A VITAL PART OF LONG-TIME, LOW-COST METERING

GIVES YOU

EASY STRIPPING

A paper dam under the sheath, surrounding the conductor assembly, improves stripping. This dam adheres to the sheath when stripped—doesn't let the saturant penetrate to the paper wrap, assures free stripping and clean conductors.

NO HOT-WEATHER TACKINESS

Pulls from the carton freely in temperatures as high as 125°F. —does not stick to your hands.

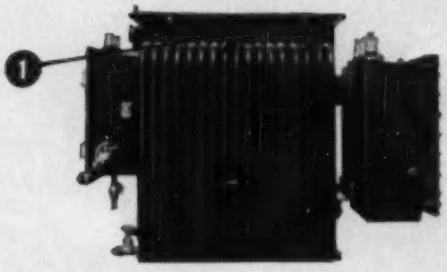
Maximum moisture resistance
Type R or Type T conductor insulation
Listed by Underwriters' Laboratories, Inc.
Sold through leading electrical wholesalers.

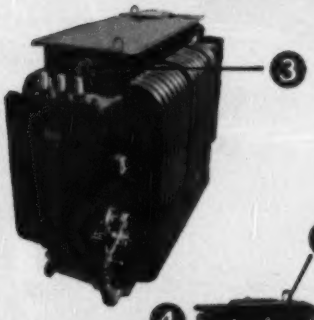
EVERYTHING IN WIRING POINTS TO

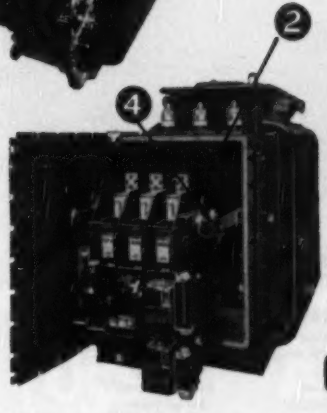
National Electric
PRODUCTS CORPORATION
1308 Chamber of Commerce Building, Pittsburgh 19, Pa.

YOU SAVE ON MAINTENANCE when you specify

Standardized Network Equipment







1 MAJOR GASKETS ARE ELIMINATED by welding, not bolting, transformer cover and switchbox to the main unit. Locating the tap changer behind a pipe plug eliminates a packing gland around an external shaft.

2 BUSHINGS can be removed externally, without opening the main transformer tank.

3 ALL TRANSFORMER ACCESSORIES—liquid-level gages, thermometer, tap changer, and all valves—are located at the high-voltage end of the transformer, easy to get to and check.

4 NETWORK PROTECTOR can be slid out on rails for quick inspection. Relays plug in—can be easily removed and replaced for checking.

PLUS **FASTER DELIVERY**—G-E standardized network transformers and protectors can be supplied on shorter delivery.

LOWER PRICE—G-E standardized network units are appreciably lower in price than non-standard designs.

LOWER INSTALLATION COSTS—G-E standardized network units are designed for narrower, shallower vaults, saving substantially in vault-construction costs.

Ask your G-E representative or write to Apparatus Dept., General Electric Company, Schenectady 5, N. Y. for full information on standardized network equipment. Bulletin GEA-5024 describes network transformers; GEA-2017, network protectors.

INCREASED Interrupting Ratings on Network Protectors

Type	Continuous Rating in Amperes	Interrupting Rating in Max. R.M.S. Amperes
MG-13	200 to 600	20,000
MG-8 or MG-9	800, 1200, 1600 2000 2500 and 3000	30,000 35,000 60,000

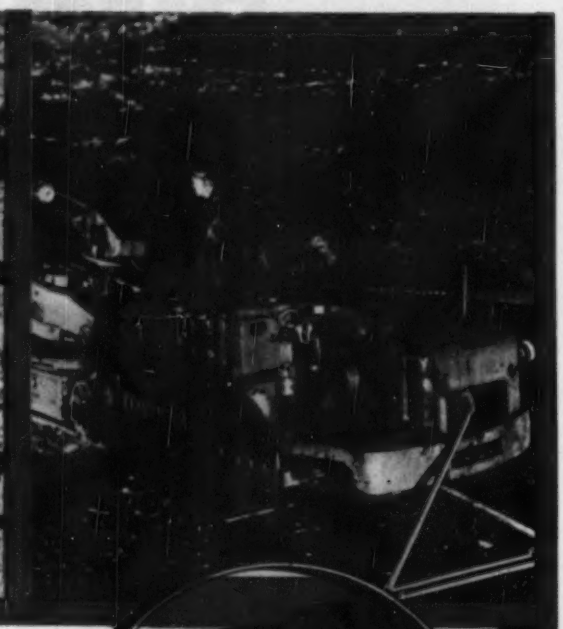
GENERAL ELECTRIC

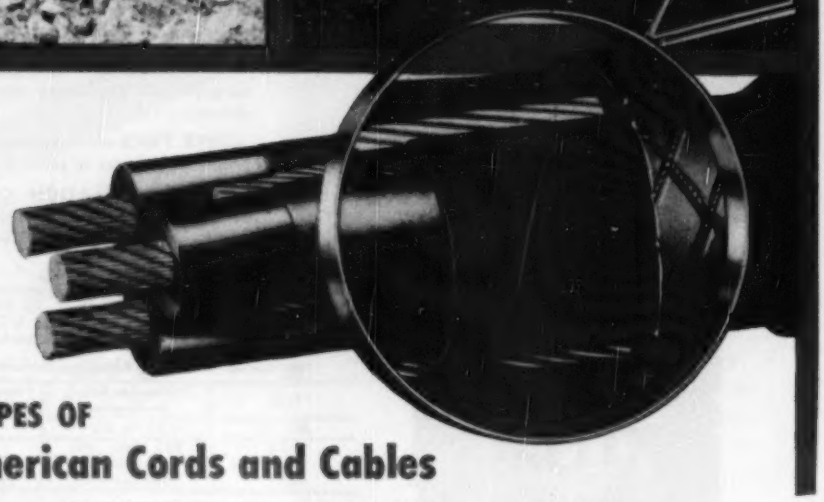
403-80

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Rough going for

But U·S·S Amerclad does the job,





TYPES OF
U·S·S American Cords and Cables

PORTABLE CORDS

For heavy-duty electrical tools such as drills, hammers, grinders, reamers, saws, pumps, etc.
Oil-Proof Neoprene Cords
Miners Lamp Cord
Shot Fire Cord

PORTABLE POWER CABLES

Type SH-D Three Conductor
Shielded Type G Three Conductor with ground wires.
Type W Three Conductor
Type W Four Conductor

MINING CABLES

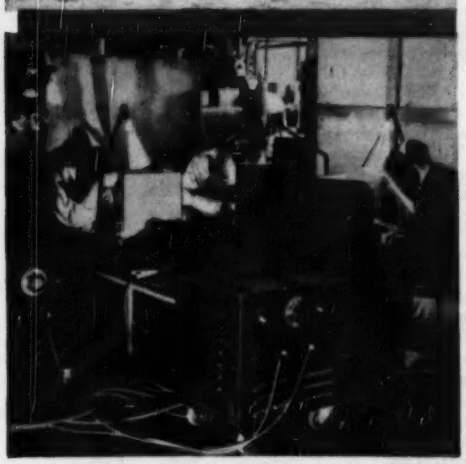
Locomotive gathering cables—single conductor mining machine cables:
Two conductor, Round
Two conductor, Concentric
Two conductor, Twin Parallel
Two conductor, Twin Parallel with ground wire

MISCELLANEOUS

Railway Utility Cables
Motor Lead Cables
Welding Cables
Grounding Cables
Traveling Cables

these cables

on the ground or in the ground



● It's hard to imagine operating conditions that are tougher than those shown on these pages.

The coal cutter, for instance: This machine has a take-up reel that constantly coils and uncoils the cable. The strong Amerclad Cable must withstand continual flexing, and it must resist acid waters and high temperatures. Additional proof of superiority is the fact that Amerclad Cables easily pass the State of Pennsylvania flame test for mining cables.

You'll find Amerclad Cables widely used for electric power shovels and other equipment that must operate out in the open. Sunshine won't crack the specially compounded "tire-tread" rubber that can be dragged over sharp rock and rough floors without damage.

For the high voltages, Amerclad Cables are supplied with a conducting rubber tape known as PS Shielding. This eliminates one big disadvantage of metallic shielding—which, when kinked, often separates from the insulation and causes corona discharge. PS Shielding is a development of the American Steel & Wire Company engineers. It has proved so successful that other electrical wire companies have been licensed to use this construction.

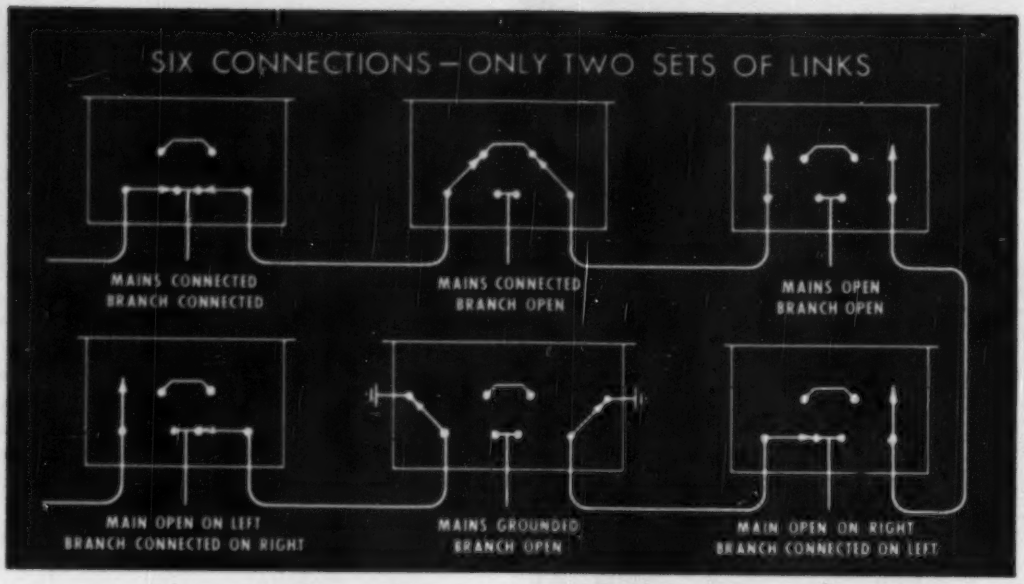
You can bury Amerclad Cables deep in the ground, without any protection. Water can't penetrate the live rubber cover. And you eliminate expensive conduit or overhead pole systems.

There is an Amerclad Cable for every need—cords for portable machinery and tools, cables for mining machinery, trolley buses, dredges, welders, machine tools, etc. And—this is important—our complete range of rubber compounds can be *combined* in cable construction to fit the requirements of every industrial, mining and submarine installation.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

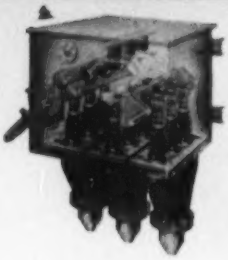
USS **AMERCLAD CABLES**

UNITED STATES STEEL



Secure System FLEXIBILITY

With the VERSATILE and SIMPLE Type "RAL" MULTIPLE CIRCUIT LOAD BREAK SWITCH



The basic Type "RAL" switch unit, shown in phantom view at the right, consists of two sets of rocker arm links and cableheads for two mains and one branch circuit.

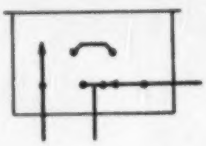
Each set of links can be in one of three positions—OFF (vertical), ON tie (45° angle), or ON tap (horizontal). A ground connection may be added as a fourth link position to permit one or both sides of the loop to be grounded for working on cables.

The basic design may be varied in many other ways. Individual problems of sectionalizing, location, and space limitations may be solved by changing cablehead locations. Main and branch cablehead locations may be interchanged—cableheads may be placed at the top, sides, or bottom of the tank, and the tank may have a throat on the side for direct attachment to a transformer. Individual cable specifications determine the style of cable entrance used.

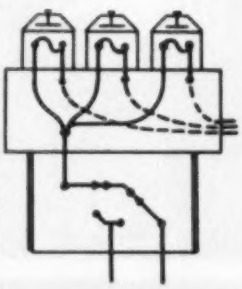
Let this versatile switch provide an efficient and economical solution to your distribution problem. Send us an outline of your switching requirements and we will quote on the proper switch at no obligation to you.

The branch may be switched on and off without disturbing loop continuity by using the outer instead of the middle location for the branch cablehead.

The branch cablehead may be on the bottom, side, or top of the tank.



Type "FC" oil fuse cutout boxes are combined with Type "RAL" oil switches to save space and installation labor. Power fuse cabinets may be used for higher interrupting capacities.



Write for Bulletin H49—"Primary Cable System Flexibility."

ELECTRIC SPECIALTY COMPANY

7780 DANTE AVENUE • CHICAGO 19, ILLINOIS, U.S.A.

Representatives in principal cities. In Canada, Powerlite Devices, Ltd., Toronto

For Building or Rebuilding Transformers...

Tierney uses NATVAR 400

The Tierney Electrical Manufacturing Company, Seattle, Washington, founded in 1933, repairs and manufactures distribution, power, and special transformers, and also repairs and rewinds any type or size of motor.

Like many other repair shops and smaller manufacturers, Tierney has discovered what the larger manufacturers already know—that it is profitable to standardize on Natvar products.

All Natvar flexible insulations are consistently uniform, no matter when or where purchased. They are immediately available either from your Wholesaler's stocks or direct from our own.

Natvar

Natvar Products

- Varnished cambrics—straight cut and bias
- Varnished cable tape
- Varnished canvas
- Varnished duck
- Varnished silk
- Varnished special rayon
- Varnished Fiberglas cloth
- Silicone coated Fiberglas
- Varnished papers
- Slot insulation
- Varnished tubings and sleevings
- Varnished identification markers
- Lacquered tubings and sleevings
- Extruded vinyl tubing and tape
- Extruded vinyl identification markers

Ask for Catalog No. 21

Represented by Electrical Specialty Co.

San Francisco 3, 316 Eleventh St. · Los Angeles 13, 418 East Third St. · Seattle 1, 2406 First Ave. · Denver 2, 1015 21st St.

THE NATIONAL VARNISHED PRODUCTS Corporation

Telephone Rahway 7-0800 · Cable Address NATVAR: Rahway, N. J.

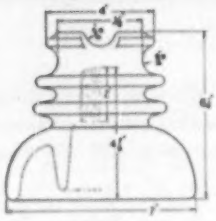
233 RANDOLPH AVENUE ★ WOODBRIDGE, NEW JERSEY

NEW FROM VICTOR

No. 26

PINTYPE INSULATOR

SOLVES 2 DISTRIBUTION PROBLEMS



NO. 26 DATA

Nominal voltage rating	27 KV.
60 cycle dry flashover	95 KV.
60 cycle wet flashover	60 KV.
Negative impulse flashover	190 KV.
Positive impulse flashover	150 KV.
Dry arcing distance	7⅛ in.
Leakage distance	15 in.
Pintale diameter	1⅝ in.
Recommended pin height	7 in.
Cantilever strength	3,000 Lbs.
RIM (pin)	8,000 MV.
RIM (radio-head)	100 MV.
1000 KC at supplied	15 KV.

1. **STEPPED-UP VOLTAGES**—VICTOR's No. 26 is designed to be used in *raising* insulation levels on present lines, or *providing* for future voltage increases on proposed low voltage lines. It has a rated 60 cycle dry flashover of 95 KV. and a wet flashover of 60 KV., with a nominal voltage rating of 27 KV. So, by installing these new pintypes now, you can keep replacement costs at a minimum when line-loads are increased.

2. **CONTAMINATED AREAS**—VICTOR's No. 26 insulator lowers maintenance costs in fog and contaminated regions because of its *self-cleaning design* and *long leakage distance*. This means fewer replacements as well as less maintenance.

For more information consult our new Condensed Catalog (Bulletin No. 4), write us, or call your VICTOR representative!

VICTOR INSULATORS Inc.

VICTOR NEW YORK

Look for this trade mark of enduring service

V

YOU, TOO, CAN GET...

Maximum Output from Portable Electrical Equipment

...If You Look To Input First!

Without a steady input of power, even the best electric machines, tools, and appliances fall short of top performance. And without portable cords and cables that will stand up under every operating condition you can't get steady input.

To meet the need for long, trouble-free service on all operations, Simplex-TIREX Cords and Cables are carefully designed with an eye to flexibility, electrical stability, and safe operation, and to assure toughness are jacketed exclusively with Selenium Neoprene Armor. Here's a compound that has proved itself under the most severe conditions of mining, construction, shipbuilding, and shop work to be unexcelled for balanced resistance to oils, grease, acids, moisture, flame and sunlight. It is CURED-IN-LEAD to gain extra toughness and assures effective resistance to abrasion, crushing, and twisting. When your portable apparatus is TIREX-equipped, Selenium Neoprene Armor provides security against untimely breakdowns and low output.

TIREX Cords and Cables are made in sizes and types to meet all specifications. For complete information and help in selecting those best suited to your needs, specify your choice of TIREX catalogs on the coupon below and return it today.

SIMPLEX

WIRE AND CABLE CO.

79 Sidney St., Cambridge 39, Mass.

SIMPLEX WIRE & CABLE CO.
79 SIDNEY ST., CAMBRIDGE 39, MASS.

GENTLEMEN: PLEASE SEND THE CATALOG(S) MARKED

☐ TIREX CORDS ☐ TIREX 600 V. CABLES ☐ TIREX HI-VOLTAGE CABLES

NAME _____ TITLE _____

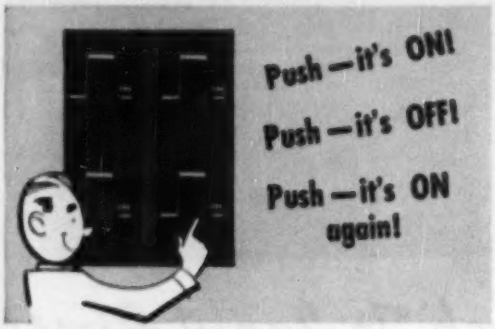
COMPANY _____

STREET _____

CITY _____ STATE _____

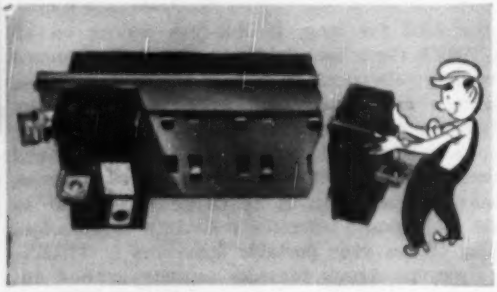
Pushmatic® Electri-Centers . . . first in circuit protection and control

● Simplest switching! ● Surest protection! ● Most flexibility! ● Fastest delivery!

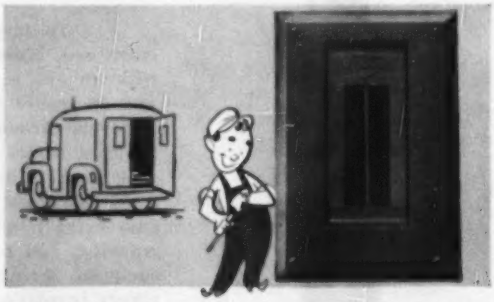


Simplest switching. Easy as ringing a doorbell! Push of finger switches the current either ON or OFF. If Pushmatic is automatically tripped by short or overload, just push and service is restored. No bothersome resetting by hand . . . no fuses to buy. Only Pushmatic offers simple push-button switching.

Surest protection. Pushmatics operate with split-second precision when overload or short occurs. Automatic tripping is entirely independent of manual operation. For installations subject to unusual temperature variables, Ambient Compensated Pushmatics carry 100% of their normal rating at any ambient temperature between 30°F. and 150°F.



Most flexibility. Compact Pushmatics are identical in size and contour, regardless of rating or type. Each unit can be quickly, easily inserted or removed from a panel without disturbing other units. Units may also be interchanged any time to meet changing electrical requirements.



Fastest delivery. From their adequate stock of interchangeable Pushmatics and basic Electri-Centers, local Distributors and Contractors can make prompt deliveries to meet your specifications. There's a Pushmatic to meet every load condition: THERMAL-MAGNETIC and THERMAL-MAGNETIC with exclusive AMBIENT COMPENSATING FEATURES. Ratings of 15, 20, 30, 40 and 50 amperes, 1 pole, 120 V., or 2 poles, 120-240 V., A.C.

BULLDOG

Pioneers in flexible electrical distribution systems

BULLDOG ELECTRIC PRODUCTS COMPANY
DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

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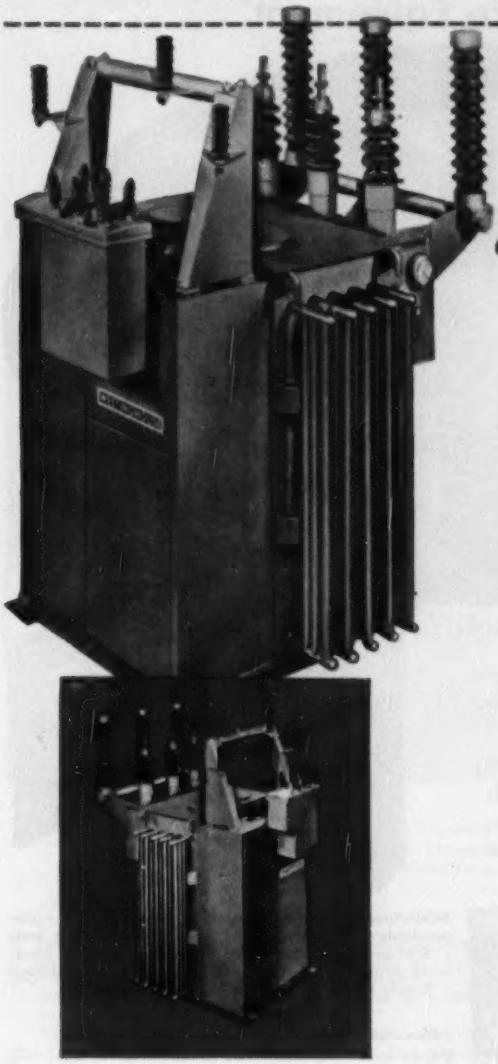
Paul L. Mullenbach Co.
3008 E. Olympic Blvd. Tel. Angelus 9-8101
Los Angeles 23, Calif.

YOU CAN BE **SURE**.. IF IT'S
Westinghouse



The JUNIOR "CSP" POWER TRANSFORMER

NEW ECONOMY

... for small capacity substations

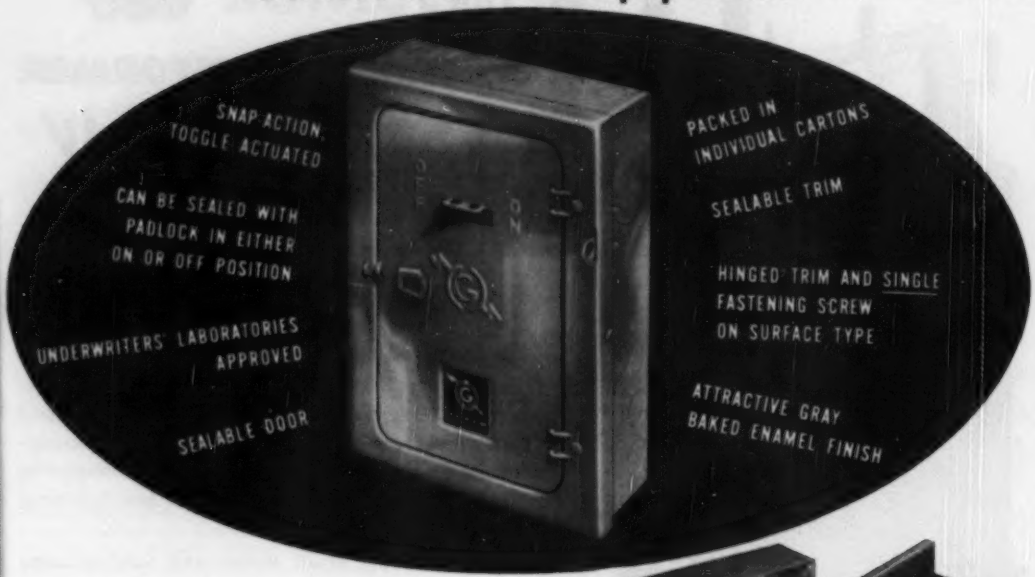
Here's the substation that fills a long apparent need in the power distribution field . . . a smaller, yet complete, substation with integral high and low-voltage switchgear as well as metering equipment. And what's more, it's "CSP" (Completely Self-Protecting), with both thermal and lightning protection built in.

Designed for small towns and similar areas where the capacity of the feeder does not justify a larger rated "CSP" Power Transformer, the new "CSP" JUNIOR provides all the advantages of compactness, simplicity and ease of operation . . . PLUS *low cost.*

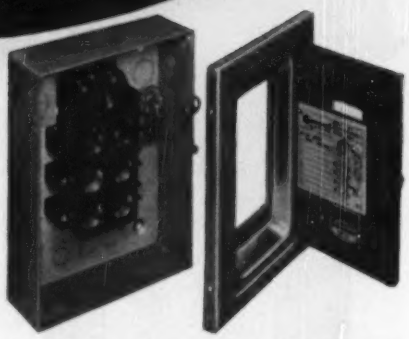
Available in 300 to 1000-kva ratings. For further information on all ratings of "CSP" Power Transformers, contact your Westinghouse representative, or write for Booklet B-4692. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania, J-70572-A

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

Completely Re-Engineered
FRONT OPERATED TOGGLE
Service Entrance Equipment


SNAP ACTION, TOGGLE ACTUATED
CAN BE SEALED WITH PADLOCK IN EITHER ON OR OFF POSITION
UNDERWRITERS' LABORATORIES APPROVED
SEALABLE DOOR
PACKED IN INDIVIDUAL CARTONS
SEALABLE TRIM
HINGED TRIM AND SINGLE FASTENING SCREW ON SURFACE TYPE
ATTRACTIVE GRAY BAKED ENAMEL FINISH

Cat. No. 63324



General's new Front Operated Toggle Service Entrance Equipment has been completely redesigned to incorporate the very latest engineering features.

The unit shown above is Cat. No. 63324 which is a 30 amp. 3 wire, 2 main fuse front operated toggle switch controlling four plug fuse branch circuits. Other types of 30 amp. combinations are available—fused or unfused mains—2 or 3 wire service—up to six branch circuits—*flush or surface.*

For further details see page 20, Cat. 4809-A —write for your copy today.

Available exclusively through wholesalers.

Cat. No. 633NP

Solderless pressure wire connectors on line side • Dependable full-floating contacts • All bakelite unit • Will accommodate non-tamperable fuses • Insulated neutral (bonding screw furnished for grounding) • Ample wiring room and abundant knockouts.

Also available—
Front operated toggle, plug fused safety switches

General Switch Corp.
49 Roebling Street Brooklyn 11, N. Y.

One of the largest Manufacturers of:

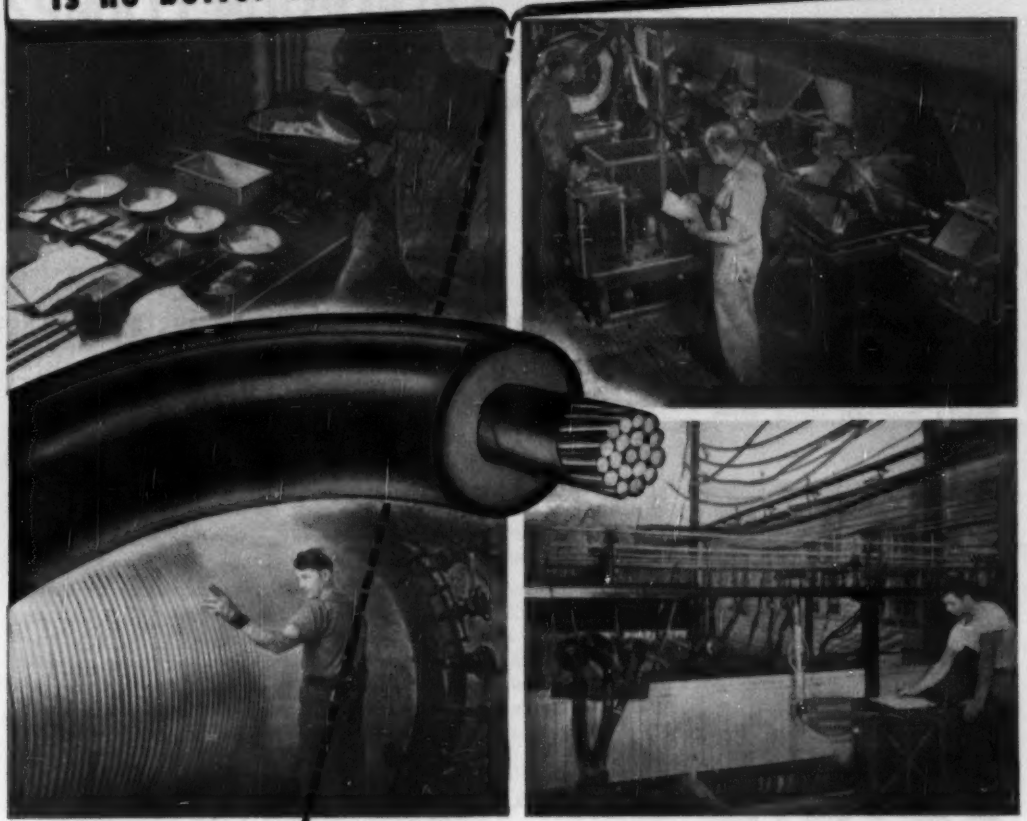
SERVICE EQUIPMENT . . .
Pullout, Front Operated Toggle and Side Operated types. Indoor—surface or flush, and Outdoor.

ENCLOSED SAFETY SWITCHES . . .
30 through 1200 Amp., 250 V and 600 V Type A, C and D. Indoor and outdoor. HP rated.

BRANCH—CIRCUIT PANELS

SALES OFFICES IN EVERY MAJOR CITY

a NEOPRENE SHEATH is no better than its COMPOUNDING*



"Too much stress cannot be laid on the important fact that the best neoprene products are produced by those manufacturers who are skilled in the art of compounding neoprene."

E. I. du Pont de Nemours & Company, Inc.

Neoprene is a raw material. With neoprene it is possible to make a cable sheath that combines resistance to weather, oils, chemicals, flame and ozone – thus increasing the life and versatility of an electrical cable. But the *use* of neoprene alone does not guarantee all its advantages.

The performance of a neoprene sheath depends on experienced compounding . . . the use of ingredients that give optimum characteristics and yet assure secure bonding to the insulation . . . the skill and technique of processing, applying and vulcanizing.

The Okonite Company, originator of neoprene-sheathed cables, has been producing them for nearly 20 years. Okonite's neoprene sheath, called Okoprene, has an unequalled service record under every condition of use. Even at operating temperatures ranging from 75° C to below —18° C, Okoprene remains easy to handle and will not deteriorate. Cables protected with Okoprene do not develop harmful surface discharge.

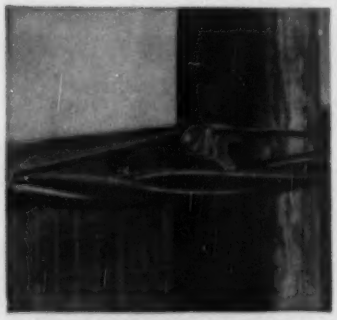
Remember, it is necessary to compound the raw neoprene material with other ingredients in order to use it. It's the finished compound that counts. And – in these days of high installation and maintenance costs – the outstanding performance of an Okoprene sheath is more important than ever to *true cable economy*. The Okonite Company, Passaic, N. J.

THE BEST CABLE IS YOUR BEST POLICY

8100

OKONITE SINCE 1878 ***insulated wires and cables***

ARE YOU USING THE RIGHT SUSPENSION CLAMP?



PA190—a single bolt, light duty Clamp, showing messenger placed above through bolt.

PA190—messenger below through bolt. Body casting is tapped to permit through bolt to serve adequately as the clamping bolt as well.

Aerial Cable Suspension Clamps

are designed for simplified installation, superior performance, and long service life.

Illustrated here are two new MIF Suspension Clamps designed especially for use with self-supporting type aerial cable. Both Clamps hold the cable well clear of the pole and provide unusual stability. Messenger may be placed either above or below through bolt. Castings are malleable iron, hot dip galvanized.

As a result of over 20 years' experience manufacturing Suspension Clamps for all types of aerial cable, MIF offers a complete line of Suspension Clamps for every application. All MIF Suspension Clamps combine four functions in one fitting: clamp, support, spacer and pole plate. Write for descriptive literature on Suspension Clamps, Guy Clamps, Guy Hooks, Washers and many other MIF pole hardware specialties.

MALLEABLE IRON FITTINGS COMPANY
Pole Hardware Div., Branford, Conn.
N. Y. Office: 30 Church St.
Canadian Mfr. & Dist.: LINE & CABLE ACCESSORIES, Ltd., TORONTO

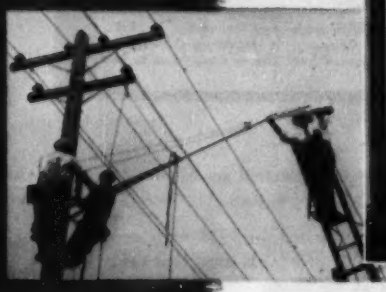
PA192A—Note distance at which cable is held from pole. Ends of grooves are belled to permit turns up to included angle of 90°.

PA192A—with messenger below through bolt, showing small amount of tape cut back required on either side of Clamp.

Representatives: WM. J. COTTRELL CO., Portland, Ore. • JAMES H. DREW CORP., Indianapolis, Ind. • INDUSTRIAL ENGINEERING & EQUIPMENT CORP., Los Angeles, Cal. • MINTEER & JOSLER, Chicago, Ill. • E. A. THORNWELL, INC., Atlanta, Ga. • J. P. VOIGHT, Summerville, S. C. • WALTHAM, DE WITT & KRUSI, San Francisco, Cal. • L. R. WARD CO., Dallas, Tex. • WILLIAMS SALES AGENCY, Fort Myers, Fla. • O. C. WITTE CO., Detroit, Mich.

Extra strength ... for Extra length

HUBBARD TRUSS TYPE
UPSWEEP MAST ARM



CHECK THESE ADVANTAGES

- ✓ Exceptional strength . . . four-way triangular truss arrangement.
- ✓ Require small pole mounting space.
- ✓ Meet all EEI-NEMA specifications.
- ✓ Simplicity of design means low cost.
- ✓ "Free flowing" internal wiring — beveled pipe ends — no sharp bends — no obstructions.

Hubbard Truss Type Upsweep Mast Arms embody the features which Hubbard has pioneered in other members of the "Upsweep" arms and brackets. In the three years since their introduction they have received wide acceptance with the Electrical Industry because of the special and desirable features which they possess.

The No. 3944 series has exceptional strength in all sizes, greatly in excess of the most severe service requirements. Six-inch threads at both ends of supporting rods provide leveling and lift adjustment. The Arms may be used with internal or external wiring.

HUBBARD AND COMPANY

ESTABLISHED 1843

PITTSBURGH • CHICAGO • OAKLAND, CALIFORNIA

"Hang the load on Hubbard Hardware!"

GAS-FILLED CABLE

The first test section of General Electric gas-filled cable went into service in 1938. This installation, by Consolidated Edison Company, is providing dependable service today. Manhole lengths of cable, removed from time to time, prove to be in perfect condition.

TESTED AND PROVED

. . . by more than 1,000,000 feet now in successful operation!

Low-pressure gas-filled cable—From 10 to 15 lb per sq in.—three conductors, three gas channels, with lead sheath. For 10 to 46 kv operation.

Medium-pressure gas-filled cable—Approximately 45 lb per sq in.—three conductors, three gas channels, and reinforced lead sheath. For voltages above 46 kv.

High-pressure gas-filled cable—Pressures to 200 lbs per sq in.—single conductor, with reinforced, double lead sheath and center gas channel. For operation at 69 kv and above.

Right! Today, over a million feet of General Electric gas-filled cable are in service, with never a failure due to inherent causes.

From the first 5000-foot test section installed in 1938 to a recently-completed installation of more than 40,000 feet, G-E gas-filled cable has operated to the complete satisfaction of its users.

Experience proves conclusively that the stable insulating and impregnating compound used in General Electric gas-filled cable is not affected by the presence of nitrogen gas, limited amounts of oxygen, or even mild ionization. Tests on laboratory samples and on cables in actual service show no measurable deterioration. Even after years of normal use, lengths of cable removed from service proved to be in perfect physical and operating condition.

If you would like to have the advantages of self-supervision and dependability for your high-voltage transmission and distribution circuits, choose General Electric gas-filled cable.

For complete information on the many features of gas-filled cable, as well as operating and performance data, get your free copy of the booklet, *G-E Gas-filled Cable*. Write to Section W19-1025, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.

You can put your confidence in—

GENERAL ELECTRIC

"SEEING EYES"

for PROFITABLE PRODUCTION

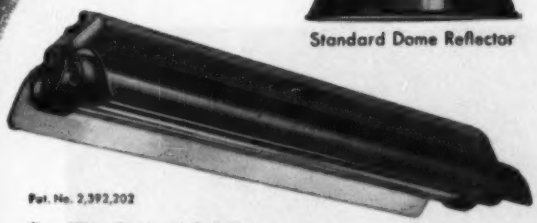
Without good clear vision on the job, even the most skilled production worker falls short of top performance. That's why good lighting equipment is a basic essential for consistently profitable production.

Appleton Lighting Fixtures provide the *right* light, without uncomfortable glare, troublesome contrast or shadow. Each type is a model of mechanical simplicity—economically installed, easily wired, conveniently serviced.

Products of more than a half century of experience, Appleton Lighting Fixtures are made to suit every industrial requirement—including hazardous locations—whether indoors or out. For the finest illuminating equipment or expert assistance on any lighting problem, contact Appleton—Standard for Better Lighting.

...olite High Mounting Fixture
For High Bay Interiors

Standard Dome Reflector



Pat. No. 2,392,202

The EFU—First and Still Finest
Fluorescent Explosion-Proof Lighting Fixture

Available with two 40 Watt, 48" Lamps
or two 100 Watt, 60" Lamps.

Pat. Applied For

Type EVX Vented
Explosion-Proof Fixture

Available for 60, 100, 150, 200, 300 and 500 Watt Lamps.

Standlite—for Filling Stations, Parking Areas

SOLD THROUGH ELECTRICAL WHOLESALERS

APPLETON ELECTRIC COMPANY

1709 WELLINGTON AVENUE • CHICAGO 13, ILLINOIS

LOS ANGELES 12, 100 N. Santa Fe Ave. SAN FRANCISCO 1, 655 Minna Street

SEATTLE 9, 115 Ray Street DENVER 2, 1921 Blake Street

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

Built to Cut Maintenance

EASIER MAINTENANCE PROCEDURES and lower maintenance costs are important features of this brand new line of large motors. One man can perform all routine maintenance procedures, including opening up the motor for cleaning. Bearing surfaces are not exposed to abrasive grit and dirt during cleaning operations.

The appearance of this new line of large motors reflects the advanced design and fine workmanship that goes into their manufacture.

A well-braced, sturdy fabricated steel frame with cast-iron end brackets rigidly support and protect working parts. Ventilating openings are large to provide adequate cooling air at low velocities with resultant low sound level.

Wide Range of Sizes

These new design Allis-Chalmers drip-proof and splash-proof squirrel-cage induction motors are built in sizes from 60 hp at 300 rpm to 1500 hp at 1800 rpm. Ask your Allis-Chalmers representative to show you the details of this exceptional new motor or write for Bulletin 05B6112.

How's This for Accessibility

One man can remove the end brackets and air baffles and reach right inside motor with his vacuum cleaner or air hose. Bearing remains sealed against abrasive dirt throughout the cleaning operation.

Large air discharge openings with removable louvers allow plenty of room to get in with an electric drill for doweling and bolting the motor to the base. Plenty of room to reach up back of the stator core for cleaning.

A-3179

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

NOW...

KEARNEY

COLOR IDENTIFICATION

ELIMINATES FUSE LINK CONFUSION

SEE FOLLOWING PAGES FOR DETAILED INFORMATION

Another **KEARNEY FIRST**

TO INCREASE EFFICIENCY
IN THE STOCKROOM • IN THE TRUCK • ON THE POLE

Mindful of the time wasted and the errors made through having the wrong fuse link at the right place at the right time — due to someone's error in reading labels — Kearney has designed and is now packaging links in such a way as to eliminate this possibility. Each type Kearney Fuse Link is now packaged in a carton with its own separate, distinct color combination that makes identification almost automatic.

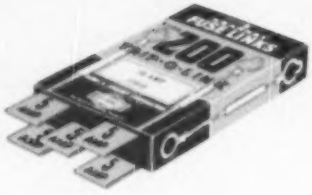
With the protection and identification features of the package together with the unsurpassed quality of the Fuse Links, you are sure to get more for your money when you specify Kearney on your next Fuse Link order.

JAMES R. KEARNEY CORPORATION 4224-42 Clayton Ave., St. Louis 10, Mo. • Canadian Plant: Guelph, Ontario

For Prompt Isolation of Troublesome Circuits – While Maintaining Service on Adjacent Lines

TYPE 200

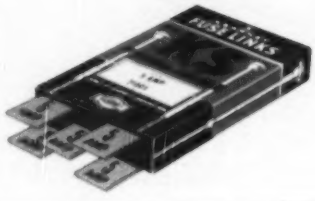
Certain circuits may prove to be more troublesome than others. When a line is subject to damaging long-time overloads and surges, continuity of service in adjacent circuits demands prompt action in isolating the troublesome line. This reliable protection is made possible by the accurate, durable characteristics of the pure tin used in the Type 200 Fuse Link. The low temperature operation of this link assures that overloads up to 150% of the fuse rating can be carried for one hour without damage to the fuse or fuse cutout.



For Reducing Outages on Circuits Subject to Switching and Lightning Surges

TYPE KS

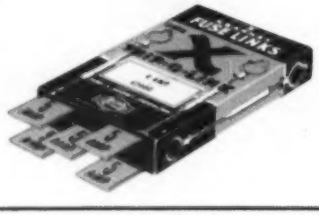
Where switching, motor-starting and lightning surges are common, maintain service by using the Type KS Fuse Link. Low temperature operation accommodates peak loads and dragging overloads with full protection to line equipment and without damage to the cutout. The overload capacities of the Type KS and Type 200 links are identical; however, the surge capacity of the Type KS fuse is twice that of the Type 200. In a thorough coordination plan, fuse links must coordinate not only with other fuses, but also with circuit breakers, and the slow speed characteristic of the KS link provides for the proper teamwork.



For Distribution Transformer Overload Protection plus *Extra High* Surge Capacity

TYPE X

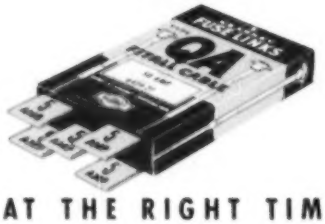
Designed to match the safe-loading curves of distribution transformers, the Type X Fuse Link keeps transformers in service during heavy overload periods and surges, and yet fuses in an instant when faults persist or reach damaging ranges. The extra high surge capacity means satisfied customers and lowered expense due to unnecessary outages. High tensile strength of Type X fuses prevents mechanical failure due to handling . . . a feature particularly important in fractional-ampere ratings. The Type X fuse is designed to carry full rated load continuously and to open 230% of rated current within 5 minutes.



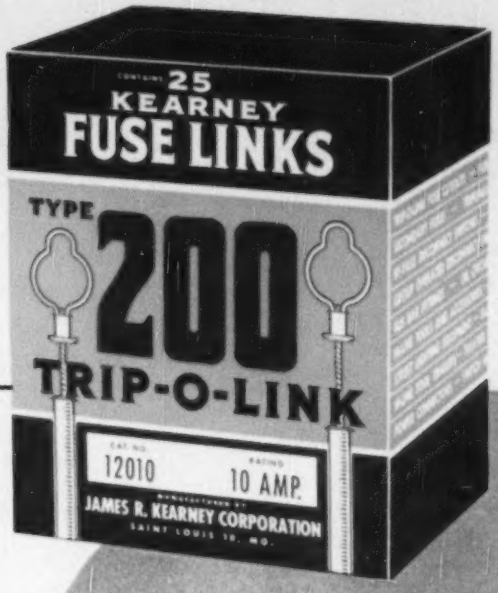
Designed to Open 150% of Rated Load Within 5 Minutes

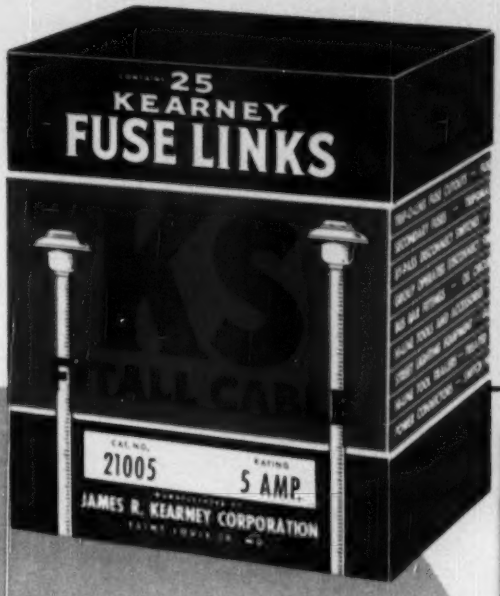
TYPE QA

The QA link is designed to open at a lower percentage of rated current and therefore will fuse more rapidly than fuse links of the same ampere rating which have been designed to open 230% of rated load within 5 minutes. For working out coordination problems involving *all* Kearney Fuse Links, minimum melting and total clearing time-current curves on NEMA standard forms, together with fuse coordination charts, will be supplied upon request.



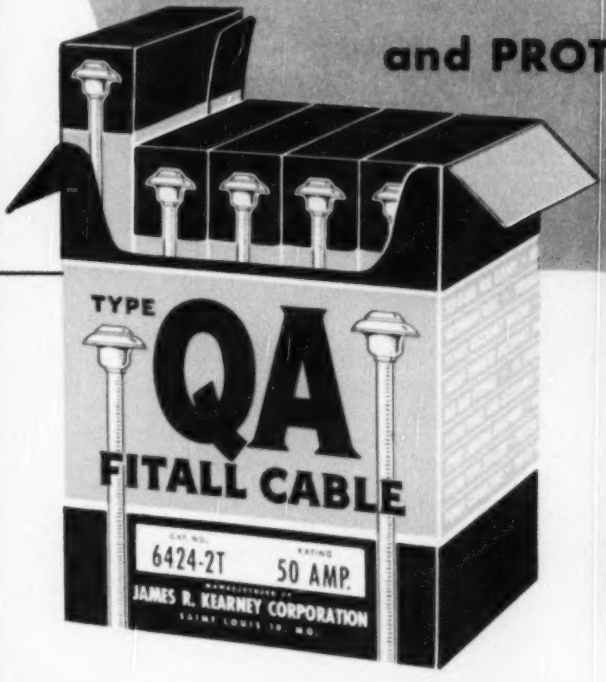
RIGHT LINK • AT THE RIGHT PLACE • AT THE RIGHT TIME





Better KEARNEY FUSE LINKS

...packaged for IDENTIFICATION and PROTECTION



JAMES R. KEARNEY CORPORATION
ST. LOUIS, MO.

5 KEARNEY FUSE LINKS

TYPE 200 TRIP-O-LINK

JAMES R. KEARNEY CORPORATION

200 K S X Q A

5 AMP

THE RIGHT LINK

IN THE RIGHT PLACE

AT THE RIGHT TIME

MAIL THIS COUPON TODAY

JAMES R. KEARNEY CORPORATION
4236 Clayton Avenue
St. Louis 10, Missouri

Gentlemen:

Please send me the complete set of time-current curves on the fuse links checked below:—

☐ TYPE 200 ☐ TYPE K-5 ☐ TYPE X ☐ TYPE Q-A

Name.....

Company.....

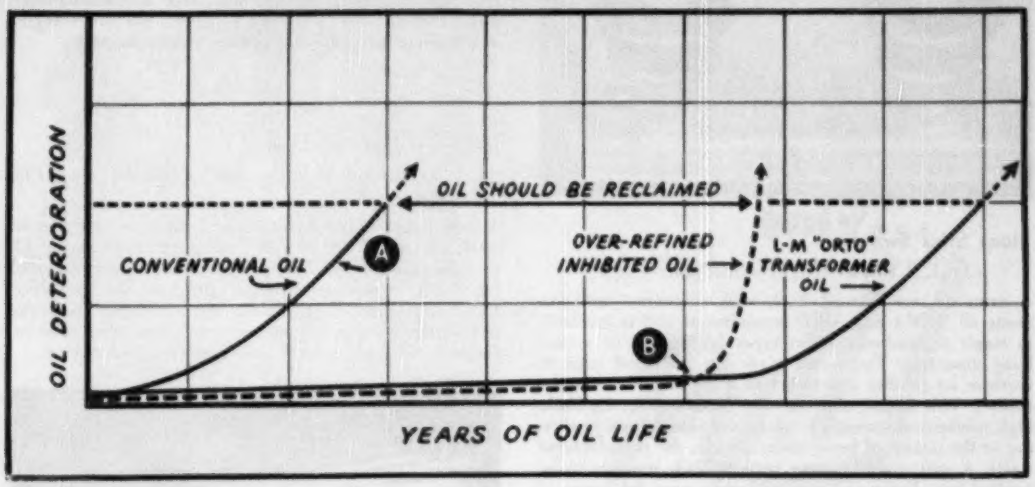
Address.....

The Color Identified PUL-TAB FUSE-PAK in the pole mounted Fuse Link Dispenser is the only positive way to *be sure* of having THE RIGHT LINK, IN THE RIGHT PLACE AT THE RIGHT TIME.

Time Current Curves for all Kearney Fuse Links are available. Use the coupon below for prompt service . . . no charge, of course.

JAMES R. KEARNEY CORPORATION
4224-42 Clayton Ave. · St. Louis 10, Missouri
Canadian Plant: Guelph, Ontario

PRODUCT NEWS



Inhibited Oil Is Oxidation Resistant

(1) Line Material Co., Milwaukee 1, Wis.

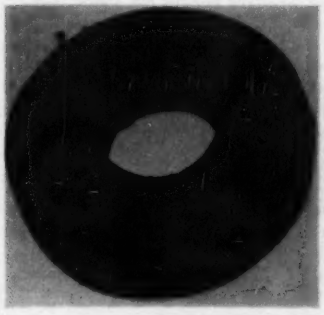
Following ten years of research, this inhibited oil that resists oxidation, acidification and sludging is available in L-M round-wound and other distribution transformers and is claimed to give improved overload capacity, longer transformer life and lower maintenance costs. Known as Orto (oxidation resistant transformer oil) the product has had laboratory and actual service tests and is claimed to last several times as long as high-grade conventional transformer oil. The manufacturer states that it has made no change in the selection of transformer oil it had been using or in its refinement but has added only the required amount of inhibitor to extend life.

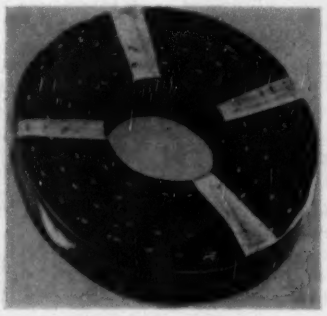
Tests are reported to show that when the inhibitor is consumed the oil will continue to operate as it would normally. Orto can be mixed with conventional transformer oil, an inhibited oil of a different brand, or a reclaimed oil, but this will result in a proportionate lessening of the beneficial protection of the inhibitor because of the dilution. The inhibitor added to Orto is almost completely inert. It has no effect upon any of the material construction of a transformer, upon common elements or other inhibitors.

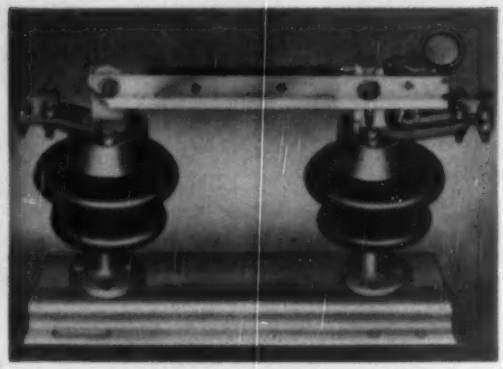
A high-grade conventional oil is shown in the curve deteriorating at a generally accelerating rate. Over-refined oils may have a better response to the inhibitor, but once the inhibitor has been used up, the oil has little resistance to oxidation and deteriorates rapidly. The inhibitor in Orto greatly extends the beginning of the deterioration, which, when it finally starts, assumes the same gradual curve as any high-grade conventional oil.

Line Material is the first to adopt use of an inhibited oil throughout its line of oil-filled distribution transformers.

Left: a transformer test coil using a good grade of conventional transformer oil, after the equivalent of about eighteen years field service. Right: an identical transformer test coil, after operating under the same conditions for the same period of time, but with Orto



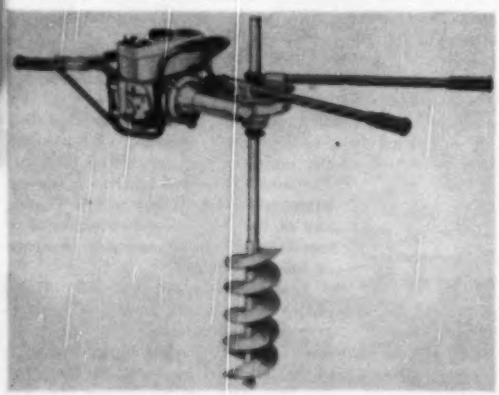




Hook Stick Switch

(2) A. B. Chance Co., Centralia, Mo.

A complete new line of hook stick disconnect switches meets all NEMA and AIEE requirements and is available in single or tandem transfer types for vertical or underhung mounting. The switch blade has a flanged edge to increase its rigidity and to act as a blade guide over the contact. This flange, plus the cross braces, gives the blade high mechanical strength to withstand side thrusts in closing or the impact of heavy short circuits, the manufacturer states. A split contact tongue permits blade pressure to be applied by a heavy coil spring, directly over the center of the contact area. The closing and pull ring mechanism is designed to give the operator extra pryout leverage for pulling the switch open under ice conditions and to hold the switch securely closed during heavy current surges. The illustration shows the single-throw 7.5- through 23-kv. switch for 400 or 600 amp.



Post Hole Digger

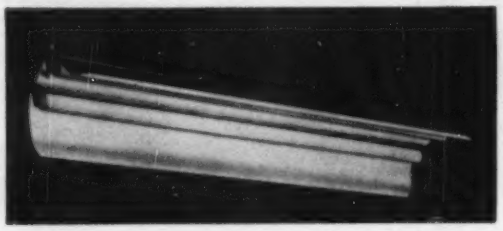
(3) McCulloch Motors Corp., 6101 W. Century Blvd., Los Angeles

This portable 5-hp. gasoline-powered post-hole digger is claimed to drill at high speed in any type of earth or clay. Augers of 6-, 9- and 12-in. diameter are available. The drill is sold either as a complete unit or as an attachment for Model 5-49 or 1225 McCulloch chain saws already in use. Chain saw attachments, with blades from 20 to 60 in. for use with the earth drill also can be obtained separately. Weight of the two-man drill complete with 6-in. auger is 79 lb. A full-swivel coupling at the engine permits the auger to drill at any desired angle and makes it possible to reverse the rotation of the auger if desired. Other features are: centrifugal clutch that automatically disengages the auger at idling speeds; kickproof automatic-rewind starter; diaphragm carburetor to permit full-power engine operation in any position; one-control operation.

Industrial Lighting Unit

(4) Mitchell Mfg. Co., 2525 Claybourn Ave., Chicago 14, Ill.

A new full-size, low-cost industrial lighting unit, model 2099, uses two T-12 40-watt fluorescent lamps, has a 13-in.-wide reflector and 5-in. lamp spacing. It was designed for chain suspension or rigid stem or rod mounting. Knockouts at either end of the channel permit mounting and wiring units end to end in continuous rows. The reflector is finished in hard glossy white baked enamel.



Motor Line Redesigned

(5) Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Redesign of its standard line of large, bracket-bearing, squirrel-cage induction motors of four and more poles to give more protection and greater accessibility has been announced by Allis-Chalmers.

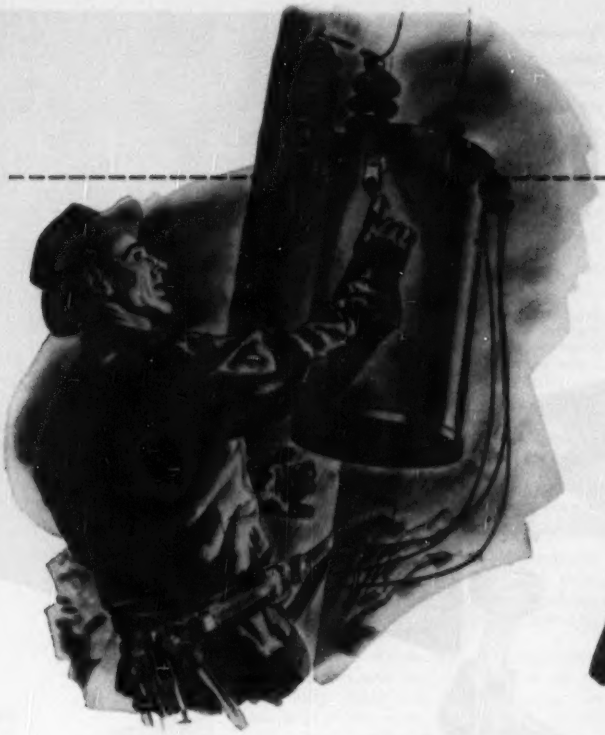
Capsule-type sleeve bearings are standard. The split, cast-iron bearing capsule or housing has a machined flange for bolting to the bearing bracket. This permits removal of the upper half of the bracket for inspection or cleaning without exposing the inside of the bearing. Similarly, the ample air-discharge openings in the side of the stator yoke, protected by removable louvers, facilitate vacuum cleaning or blowing out the air passages behind the stator core.

Since the only openings in the bearing brackets are in the air intakes near the bottom, the brackets afford protection for the ends of the motor. This construction, plus the use of louvered panels in the stator air-discharge openings, makes the standard design drip proof.

The motors are available with special electrical modifications to suit application requirements. They can be had with antifriction bearings.

Bracket-bearing, squirrel-cage induction motor construction in this line is standard for ratings up to 1 hp. per r.p.m. However, for steady, non-overloading industrial drives bracket-bearing construction may be used for ratings up to approximately 1.5 hp. per r.p.m. for motors in the high-speed class up to 900 r.p.m.

YOU CAN BE SURE.. IF IT'S
Westinghouse



For emergency only...

Pull!

When the breaker trips after repeated red light warnings, and you must get back in service without delay . . . *pull the Emergency Control!*

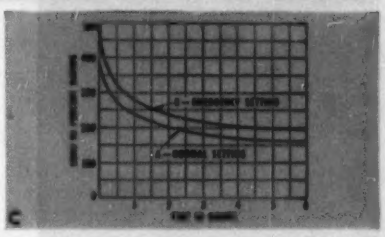
Save costly overtime.

Avoid change-outs under adverse conditions.

Emergency Control adjusts the "CSP"® breaker to allow greater overload before tripping. It permits regular crews to schedule change-outs at convenience.

Even with Emergency Control in operation, "CSP" Transformers have full lightning and short-circuit protection.

Now standard equipment on all Westinghouse "CSP" Transformers with signal lights, 5 through 100 kva, Emergency Control gives greater assurance of service continuity . . . lets you be sure of maintaining service. Contact your Westinghouse representative or write for Booklet B-4249. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-70551-A



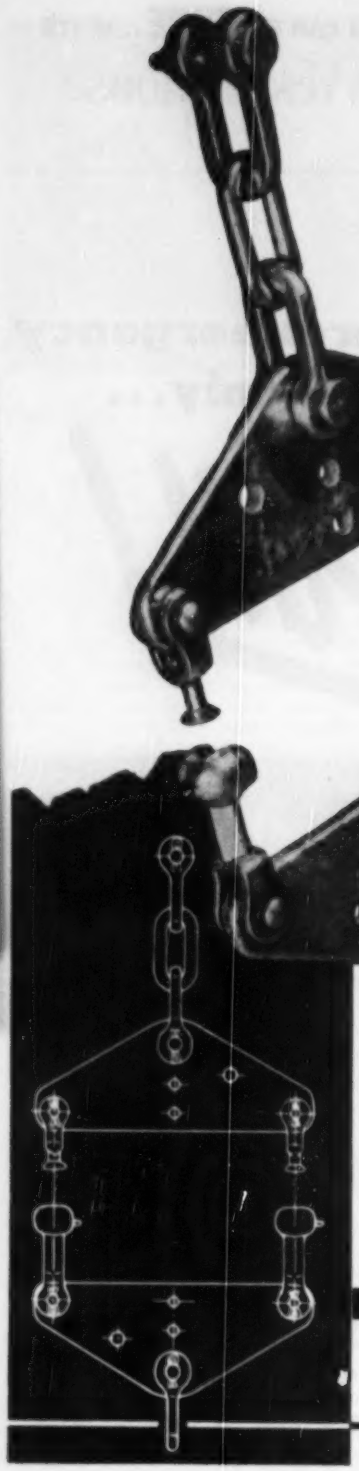
A: Emergency Control handle, secured in normal operating position with a standard meter seal.

B: Emergency Control handle in emergency position. This sets breaker for greater overloads.

C: Typical breaker trip curves, illustrating increased overloads sustained with Emergency Control.

"CSP" TRANSFORMERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver



BTC ...the COMPLETE line

STRAIN YOKE SETS

Two or more insulator strings, connected in parallel, are often required for dead-ending, high strength suspension or angle construction. To meet this need, Brewer-Titchener offers standard Double and Triple Strain Yoke Sets as part of its **complete line** of transmission line hardware. At the same time, it is prepared to design and furnish special four, six and eight string assemblies in either spring-equalized or self-equalizing types, using a minimum of costly special parts.

When inquiring about special Yoke Assemblies, be sure to provide all necessary information: full details of tower parts and conductor clamps to which assemblies are to be attached . . . conductor type, size and strength . . . normal and maximum conductor tension, with desired safety factor . . . maximum permissible overall string length for clearance . . . vertical loading and maximum expected vertical line angle to be accommodated by the one or two clamps on suspension assemblies.

DOUBLE STRAIN YOKE SETS

Drop Forged, hot-dip galvanized Steel Plates and Fittings. Offered in two string spacings and two strength ratings for Ball Socket and Clevis Type insulators. Yoke Plates are die forged with full radius round

Sold through your insulator manufacturer only.

edges and corners, superior in strength, finish and corona performance. Assembly has all-direction flexibility. Fittings rotate freely. All holes drilled and burred. Socket openings fully machined. Lower Plate-to-Insulator connectors sufficiently long to develop full flash-over values of insulator strings. All steel parts of 50,000 pound assemblies are heat-treated for high strength without weight increase.

Generally, the use of standard fittings—other than those regularly supplied—makes possible satisfactory and economical special-purpose assemblies. Special machining of plates, reforming of standard fittings or use of special parts is sometimes necessary.

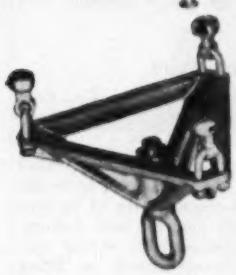
BALL SOCKET FITTINGS

No. 8700	*13" Spacing*	*36,000 Lbs. Ultimate Strength*
No. 8750	*13" Spacing*	*50,000 Lbs. Ultimate Strength*
No. 8720	*16" Spacing*	*36,000 Lbs. Ultimate Strength*
No. 8770	*16" Spacing*	*50,000 Lbs. Ultimate Strength*

CLEVIS TYPE FITTINGS

No. 8800	*13" Spacing*	*36,000 Lbs. Ultimate Strength*
No. 8850	*13" Spacing*	*50,000 Lbs. Ultimate Strength*
No. 8820	*16" Spacing*	*36,000 Lbs. Ultimate Strength*
No. 8870	*16" Spacing*	*50,000 Lbs. Ultimate Strength*

TRIPLE STRAIN YOKE SETS



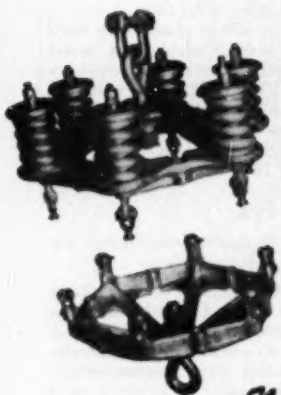
Yokes are specification steel castings. Fittings are drop-forged steel. All steel parts heat-treated and hot-dip galvanized. 75,000 pounds ultimate strength.

All direction flexibility. Load-bearing holes drilled and burred. Socket openings fully machined. No reduction in insulator string flash-over values. Excellent corona performance.

No. 9850 Ball Socket Fittings
No. 9950 Clevis Type Fittings

Standard assemblies will meet most construction requirements—special supporting bolts, shackles and links can be supplied.

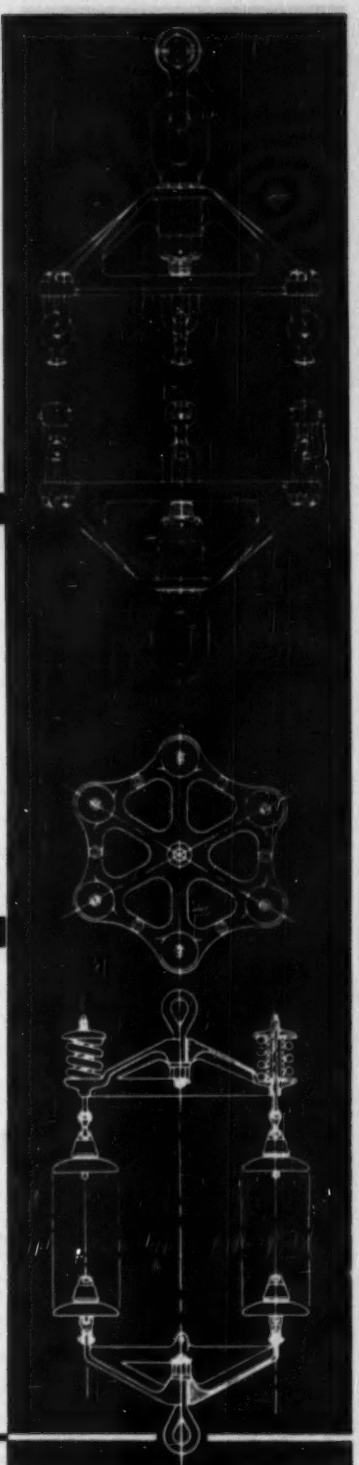
SIX STRING STRAIN YOKE SETS



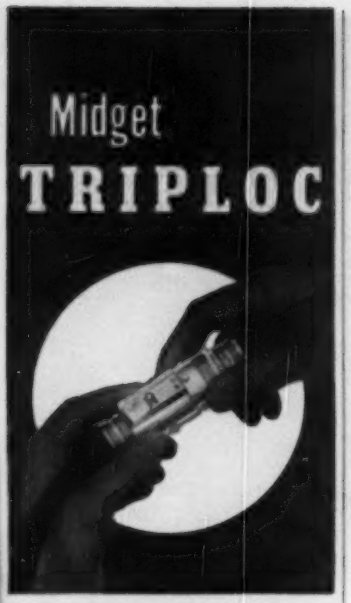
Produced only on special order.

Complete tooling available for production of illustrated assembly, on which steel springs with calculated and tested compression values are used to distribute equally conductor tension over six insulator strings. Total spring compression capacity is sufficient to function over wide range of loadings, from below normal sag tension to above ultimate strength of conductor.

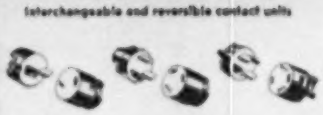
Now available . . . BTC's new Hi-Line Catalog, telling the complete story, has just come off the press. Send for your copy today.



THE BREWER-TITCHENER CORPORATION, Cortland, N. Y.



Interchangeable and reversible contact units



2 pole 3 pole 4 pole

Compact, Heavy Duty Plugs and Receptacles

Midget Triploc plugs and receptacles are ideal for use with a great variety of portable electrical equipment where operating conditions are severe. Interchangeable 2, 3, or 4 pole contact units permit many different types of assembled combinations. The protected female contacts may be assembled in either plug shell or receptacle housing for protection in line side of circuit. Automatic Bayonet locks is simple and effective; polarity is maintained and correct insertion of plug assured by keyed housings and unequal spacing of contacts. Ground protection is provided when required. Rating 10A., 250V., 15A., 125V. Consult your Pyle Catalog 1100, Bul. 1140-1, page 19, for complete listings.

CONDUIT FITTINGS • FLOODLIGHTS

THE PYLE-NATIONAL COMPANY

1334 N. KOSTNER AVE., CHICAGO 51, ILLINOIS
Pacific Coast Sales Office
28 Beale Street, San Francisco 4, Calif.

Multiple-Feed Oiler

(6) Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee 12, Wis.

A centralized system of lubricating one to 20 bearing points on machine tools, presses, high-speed production equipment, etc., has been introduced in this new automatic solenoid or manual control multiple-feed oiler.

Oil is fed by gravity from a large reservoir through individually adjustable needle valves and through copper or Neoprene tubing to the various bearings. When solenoid, located directly below reservoir, is energized, oil feeds to all lines. The oiler can be operated from a current outlet or connected directly across motor starting switch to feed automatically when starting, or stop feeding when equipment is not in operation. Manual control type has a shutoff lever at top.

Sight-feed fittings come in Pyrex or shatterproof Lucite. Reservoirs are available in three sizes: 1 pt. 1 qt. and 2½ qt. Solenoids are of standard voltage. The complete solenoid-type oiler with six outlets measures 6 in. wide, 9⅞ in. high.

Cover for Solderless Connectors

(7) O. Z. Electrical Mfg. Co. Inc., 262 Bond St., Brooklyn, N. Y.

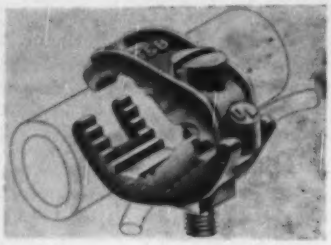
Kwi-Cover for electrical taps is claimed to eliminate necessity for taping on the manufacturer's solderless connections. It consists of a high-impact strength canvas-bakelite body and cover. Four stainless steel spring fasteners snap down and lock the assembly securely; are an integral part of the cover.

At present Kwi-Covers are available from stock for the XTP, XW, PT and PM group of connectors in the O.Z. line. It is planned to include the entire connector line in the near future, the manufacturer states.

Megger Ground Tester

(8) James G. Biddle Co., 1316 Arch St., Philadelphia 7, Pa.

The new CVM type of megger ground tester is designed to show by an easy method if the resistance to earth of man-made grounds is sufficiently low to ensure correct operation and to minimize dangers from lightning. This improved set has its own generator for supplying test current. Its terminal arrangement employs two switches that short-circuit the terminals for 2-, 3- and 4-terminal tests. Each instrument has two scales, permitting open, well-proportioned markings. Two ranges are available, 0 to 40 and 0 to 200 ohms; 0 to 100 and 0 to 500 ohms.



Ground Clamps

(9) Thomas & Betts Co., Elizabeth 1, N. J.

Listed by Underwriters' for use on copper water tube, ½ to ¾ in., these clamps are constructed of bronze in a design that prevents their crushing copper tube. They are also approved for ½- to ¾-in. copper brass or iron water pipe and ½- to ¾-in. ground rod and pipe. Catalog 3847 is for armored grounding wire, No. 4, No. 6, and No. 8. A set screw holds the armor, while the clamp itself firmly anchors the ground wire. Catalog 3846, illustrated, is for No. 4 and No. 6 bare grounding wire and is installed with one screw.

Oil Resistant Wire

(10) General Electric Co., Construction Materials Department, Bridgeport 2, Conn.

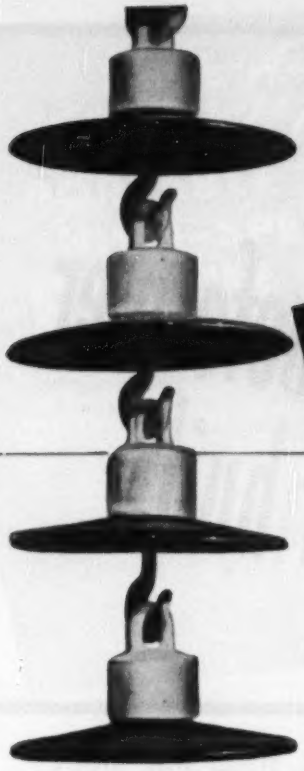
A gasoline and oil-resistant wire, called Geotrol, this wire is claimed to be the first non-lead-covered wire of its type to be listed by Underwriters' Laboratories. It is designed for wiring conduit to gas pump islands at filling stations and for lighting circuits at refineries and similar places. The elimination of a lead covering reduces cost, weight and installation time.

Conductors are insulated with vinyl compound and sheathed in a jacket that is highly resistant to petroleum products. The insulated conductors come in black, white, red, green, orange, blue and yellow. Geotrol is available with solid conductors in sizes 14, 12 and 10 AWG.

Auxiliary Eye

(11) Malleable Iron Fittings Co. Inc., Branford, Conn.

The PA155 auxiliary eye is a fitting that can be attached to either a ⅝- or ¾-in. thimble or oval eye anchor rod. It provides an additional eye to accommodate another guy, whether permanent or temporary, or to serve as a purchase for pulley blocks. Where strength of anchor rod and capacity of anchor are adequate, use of the device eliminates digging and saves time, according to the manufacturer.



1907

THOMAS was FIRST with the CAP-AND-PIN Suspension Insulator

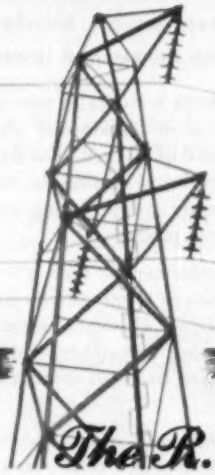
1950

THOMAS is STILL the Standard of Comparison

● In 1907, Thomas pioneering resulted in the first Cap-and-Pin Insulator. The first installation, 10,000 units, was made that year in Central California. After 43 years of continuous service, these insulators are still operating satisfactorily.

Today, Thomas suspension insulators are accepted as the standard of quality throughout the Industry. Proper designing, precision manufacturing . . . and PROOF of PERFORMANCE make them the best choice for the most difficult insulation problems. Why gamble?

Despite these unusual times, when quality and skilled workmanship could be sacrificed, you can specify Thomas Insulators with full confidence that quality and value cannot be surpassed.



The R. Thomas and Sons Co.

LISBON, OHIO
NEW YORK CHICAGO

Sales Representatives: Paul Berry, *Oklahoma City* • Ken H. Best, *Seattle* • Butler & Land, *Dallas* • John A. Clark Electric Co., *Minneapolis* • R. E. Cunningham & Son, *Los Angeles* • Electric Supply Co., *Albuquerque* • Engineer Sales Corp., *St. Petersburg* • R. F. Hamilton & Associates, *Denver* • Geo. E. Henn Co., *San Francisco* • Leiser & Co., *Philadelphia* • Lynn Elliott Co., *Houston* • John G. Pettyjohn Co., *Knoxville* • Redmond Supply Co., *Phoenix* • J. F. Schaefer & Co., *Kansas City* • R. J. Sullivan & Co., *Boston* • Triangle Electric Supply Co., *El Paso* • Joe Williams, *Little Rock* • *Representatives in other principal cities.*

SPIRAKORE®
TRANSFORMERS

Most imitated transformer ever built

Because of the Spirakore design, transformers are built much smaller, much lighter, and lower in price.

These advantages come from a basically new idea which General Electric introduced in transformer construction. The core was wound instead of stacked. The flux path followed the grain of the steel and as a result, corisil* steel could be used for transformer cores—taking advantage of this steel's unusual magnetic properties.

The first Spirakore transformer is now 13 years old. Modifications and imitations of it are used by almost every domestic transformer builder. However, from advanced electrical design down to our unmatched Melaglyp paint finish, no one else, we believe, has even approached today's Spirakore.

**Cold-rolled ORIented SILicon steel, first introduced in transformers (in 1937) as a result of work by G-E laboratory technicians and design engineers at Pittsfield, Mass.*

Apparatus Dept., General Electric Co., Schenectady 5, N. Y.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Another Amazing McCULLOCH Power Tool!

PORTABLE (79 lb. complete) HIGH-SPEED (5 hp) EARTH DRILL

New McCulloch Earth Drill Saves Time Drilling Holes for Fence Posts, Light, Power and Communication Poles, Guard-Rail Posts, Etc.

This fence crew dug 102 holes 30 inches deep in 40 minutes with a 9-inch McCulloch Earth Drill

These Are Some of Its Cost-Saving, Time-Saving Features

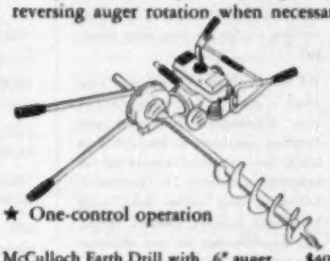
★ Special McCulloch 5-hp gasoline engine—for fast digging in any earth, including clay

★ Weighs only 79 lb. complete with auger—easy to carry and handle

★ Automatic clutch

★ Requires no maneuvering into position—just carry to exact location and drill

★ Full-swivel coupling at engine—permits (1) easy starting and convenient storage, (2) drilling at any angle, (3) reversing auger rotation when necessary



★ One-control operation

PRICES: *f. o. b. Los Angeles*

McCulloch Earth Drill with 6" auger . . . $400
with 9" auger . . . 405
with 12" auger . . . 410
McCulloch 20" Chain Saw assembly 110
(other lengths of blade and chain available up to 60")

Converts in less than a minute . . .

to a standard McCulloch Chain Saw

—the outstanding power tool for timber work of all kinds. Just detach drilling assembly and attach chain-saw assembly.

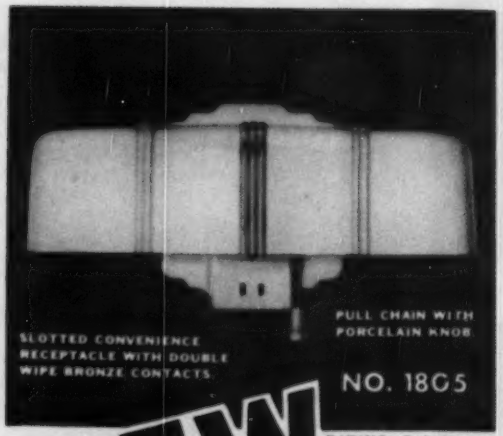
Send today for complete information and name of nearest dealer.

NATIONWIDE SALES & SERVICE

McCULLOCH MOTORS CORPORATION

Los Angeles 45, California

World's Largest Builders of Power Chain Saws



NEW

RATING: Pull Chain—250W 250V; Keyless—660W 250V. Convenience Outlet 15A-125V or 10A-250V.

PAULDING WALL BRACKET FIXTURE
• • WITH CONVENIENCE OUTLET

PAULDING NO. 1805 MOLDED PORCELAIN WALL BRACKET UNIT WITH CONVENIENCE OUTLET.

Completely wired and equipped with opaque glass shade and cadmium-plated mounting strap for 3½" and 4" outlet box or Conn X Box. Base: 5½" x 8". Sockets take two 60W bulbs. Glass Shade 11¼" long, 3¾" wide, 3¼" high.

PAULDING
PORCELAIN PRODUCTS

are the best money can buy . . . regardless of price. The quality of interior parts and working mechanisms is proved by the fact that they stay working on the job long after others fail.

THE NEW PAULDING UNIT shown here meets a great and growing demand from Wholesalers, Contractors and Retailers everywhere. No. 1805 is ideal for residential, commercial or industrial installation in bathrooms, lavatories, over kitchen sinks, wash tubs, work benches, counters, tables, etc. Recommended for use wherever directed light and an extra outlet are required from the same box.

PAULDING
OFFERS 4 TYPES
of the fixture shown.

1885 — Pull Chain with Convenience Outlet.

1806 — Keyless with Convenience Outlet.

1807 — Pull Chain, No Outlet.

1808 — Keyless, No Outlet.

805 — Pull Chain Replacement Socket.

Quality construction throughout. Approved by Underwriters Laboratories. Sold only through recognized channels.

Send for Catalog and see the entire Paulding line of wiring devices and Kaolite fixtures.

UNSURPASSED QUALITY . . . AT A COMPETITIVE PRICE

JOHN I. PAULDING, INC.
NEW BEDFORD, MASSACHUSETTS

Distribution Transformers Improved

(12) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

CSP distribution transformers with cylindrical tanks, wall-mounted primary bushings, and externally mounted lightning arresters are available in ratings below 5,000 volts. The new units are claimed to save space on the pole, make installation and operation easier, and simplify stores problems. The new design meets EEI-NEMA standards.

Ground Rod Clamp

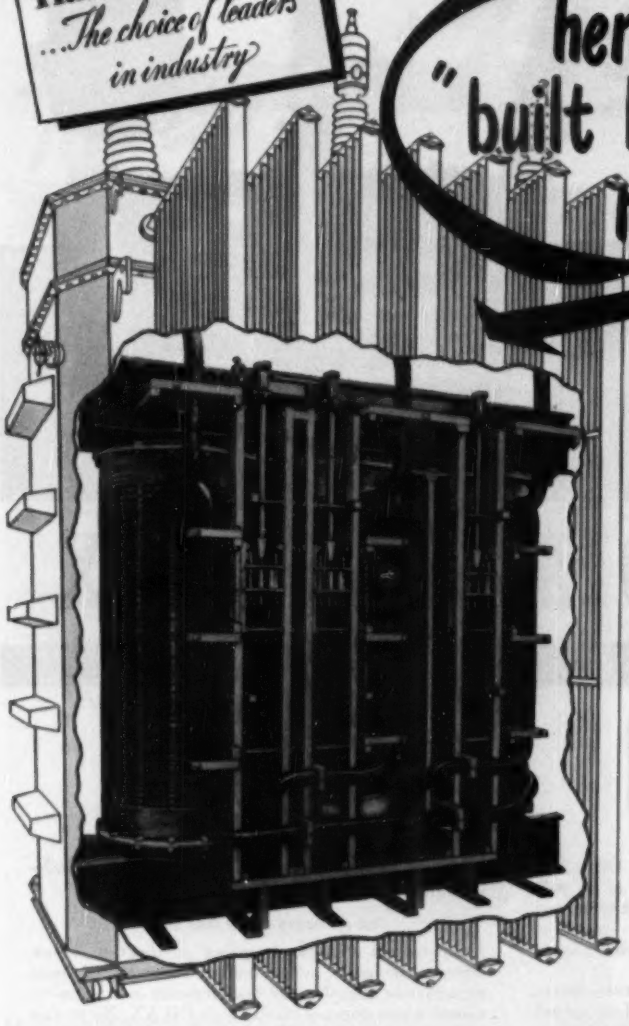
(13) A. B. Chance Co., Centralia, Mo.

A ground rod with a V-shaped slot that clamps tightly to rods and conductors of varying sizes has been announced recently. The new design also centers the wire against the ground rod to obtain maximum contact area. Clamp is of high-strength bronze; conductor and rod are held with an Everdur set screw.

(14) Two PAR- and R-type lamp holders, designed for small-area lighting, have been added to the line of flood lights offered by S & M Lamp Co., 119 W. 36th Place, Los Angeles 54. Wing-nut adjusters permit change of light direction. Both the 503 (above) and the 504 (below) have medium base sockets, 6-ft. UL listed 18-2 cord and molded plug and fit standard 4- or 3¼-in. outlet boxes.

WAGNER TRANSFORMERS
...The choice of leaders in industry

here's what "built by Wagner" means



Wagner Power Transformers have a reputation for Quality—established through sixty years of service to the power industry. Constant improvements in materials and shop practices—meticulous attention to even the smallest details of construction—rigid maintenance of quality controls—have made Wagner Power Transformers "the choice of leaders in industry." Wagner Transformers give years of uninterrupted service because of features like these:

The coils, wound with cable paper insulated conductor, are carefully insulated from each other, and are surrounded by liberal oil ducts. Coils adjacent to the line ends have extra turn insulation and additional coil-to-coil insulation to absorb the impact of high voltage line disturbances. Coil stack assemblies have locked-in insulating spacers placed radially around the coils to maintain the oil ducts. The coil stacks are vacuum-dried, then securely fastened between heavy steel end clamps and the endplate assembly, bracing the structure to withstand short circuit conditions. All outgoing leads are heavily insulated to prevent any possibility of breakdown. All leads are mechanically held in place to maintain proper electrical clearance at all times and under all conditions of operation. Snap-acting tap changers are gang operated from outside the transformer tank by means of a shaft brought out through the tank wall.

The complete story of Wagner Power Transformer construction is told in Bulletin TU-181. Write for your copy.

Wagner maintains thirty-one branch offices, located in principal cities, for quick, convenient engineering service and consultation. Consult the nearest branch for competent advice on your next transformer installation.

WAGNER ELECTRIC CORPORATION
6381 Plymouth Ave., St. Louis 14, Mo., U.S.A.

Wagner Electric Corporation
EST. 1891

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

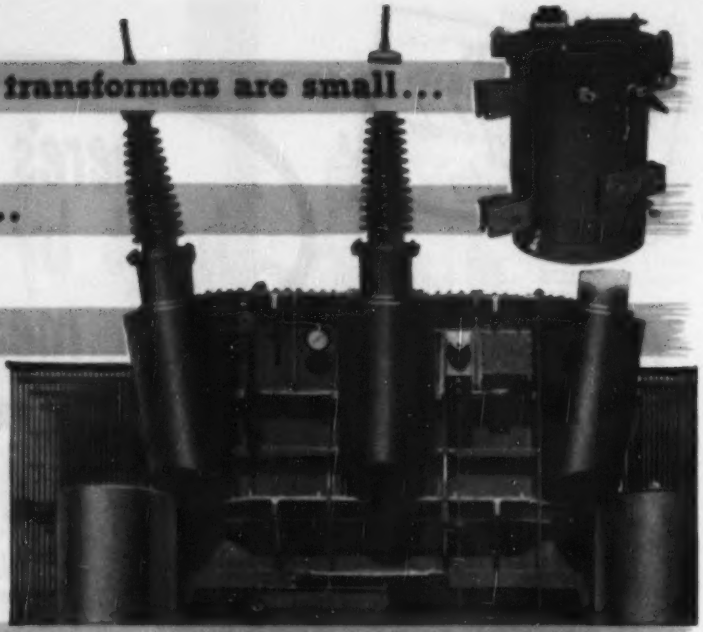
BRANCHES IN 31 PRINCIPAL CITIES

TW-50

Whether your transformers are small...

or large...

old or new...



You'll save on operating costs with

SHELL DIALA OIL A X

IT'S THE FAMOUS 50-YEAR TRANSFORMER OIL

Four years ago Shell brought out Diala Oil AX, a new, inhibited transformer oil. Because of its performance in laboratory accelerated tests, it appeared to be the long-sought answer to *oxidation*—number-one enemy of transformer oils. (Oxidation causes sludge.)

In later full-scale tests, made in transformers overloaded beyond limits ever exceeded in actual operation, Shell Diala Oil AX resisted oxidation so effectively that its *service life* was reasoned to be *five* or more *times* the life of conventional oil under comparable conditions . . . even *50 years* or more in open, air-breathing transformers.

Now, four years later, evidence keeps coming in to show Diala Oil AX is performing as predicted...

IN ACTUAL USE—Under the most severe operating conditions, Shell Diala Oil AX after four years' service is still in "like new" condition. In the same installations, conventional oils deteriorated badly in half the time.

IN INDEPENDENT TESTS—Power companies have run accelerated tests on Shell Diala Oil AX in their own equipment. Every single one of these independent tests confirms Shell's own findings.

Saves money—and then some!

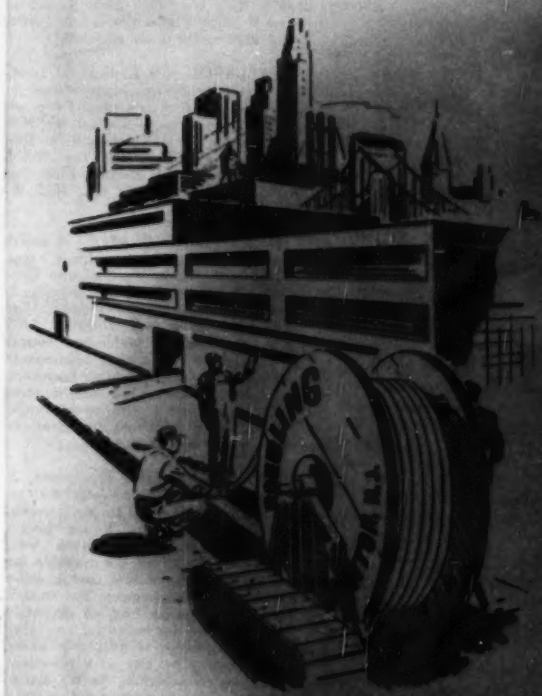
Frequent oil changes, frequent purification, transformer overhauls, oil protection devices—all those expenses in transformer maintenance can be minimized when you use Shell Diala Oil AX. No matter what other kind of oil you're using in your transformers now—no matter if they're large or small, old or new—you'll save money by switching to Shell Diala Oil AX.

AND IT'S THE IDEAL OIL FOR VOLTAGE REGULATORS AND OIL-FILLED BUSHINGS

SHELL

Also recommended for circuit breakers and oil-filled switches

Today it's Roebling!

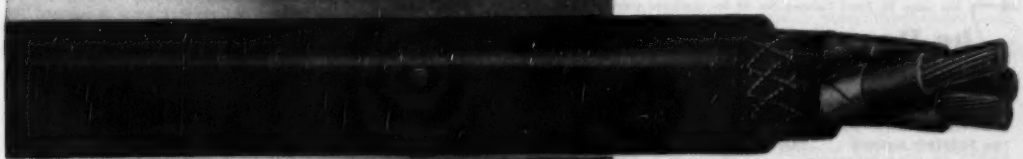


Why men who watch costs specify Roebling ROEPRENE Parkway Cable

THERE'S ONE BIG and deciding reason for choosing Roebling ROEPRENE Parkway Cable . . . it enables you to avoid the expense of underground duct systems! This cable is made for direct underground installation. Only a two- or three-foot trench is needed. And as soon as the cable is out of sight, you can put it out of mind. There'll be no service troubles from wind or weather . . . safe physical protection is assured by the non-metallic armor of a ROEPRENE sheath.

Roebling ROEPRENE Parkway Cable has rapidly become a top choice for series street lighting, parkway boulevard lighting, traffic signal, fire alarm, flood lighting, railroad yard, signal and many other circuits. It is available in single and multiple conductor types—solid or stranded—in a range from 600 to 5,000 volts.

Have your Roebling distributor or Roebling branch office help select the best cable for your special needs. John A. Roebling's Sons Co. of Calif. — San Francisco — Los Angeles — Seattle — Portland.



From copper rod to finished cable all components of Roebling electrical wires and cables are manufactured in Roebling's own plants. Painstaking care, research, engineering and modern precision machines are your assurance of highest quality.

ROEBLING

A CENTURY OF CONFIDENCE

Atlanta, 916 Avon Ave. • *Boston*, 51 Sleeper St. • *Chicago*, 5525 W. Roosevelt Road • *Cincinnati*, 3253 Fredonia Ave. • *Cleveland*, 701 St. Clair Ave., N. E. • *Denver*, 4801 Jackson St. • *Houston*, 4516 Navigation Blvd. • *Los Angeles*, 216 S. Alameda St. • *New York*, 19 Rector St. • *Philadelphia*, 12 S. Twelfth St. • *Portland*, 1032 N. W. 14th Ave. • *San Francisco*, 1740 Seventeenth St. • *Seattle*, 900 First Avenue S.

Everyone knows how Pinco Wet Plastic Process Porcelain gives Pinco 2- and 3-part Pin Types unexcelled insulating qualities how Pinco design provides husky sections and beaded edges to eliminate mechanical failure. But it's the built-in features (exclusive manufacturing techniques) not apparent to the eye in the completed unit, that provide those "plus" values so essential to RIGHT ON THE JOB performance.

What are some of these "plus" values? . . .

1. Pinco resilient compounds, applied to the porcelain surfaces in contact with cement, completely relieve the effects of thermal expansion at any temperature encountered in service.
2. Pinco cementing processes involve laboratory-controlled mixing techniques, and curing in special rooms where temperature and humidity are rigidly regulated.
3. Porcelain sand grains are of uniform size and are applied in belts of even thickness and width.

These are some of the reasons why "right-on-the job" specifiers and buyers are selecting Pinco Multi-Part, High Voltage Pin Types to insure RIGHT ON THE JOB performance.

See page 38, Pinco Catalog No. 49 for complete electrical and mechanical characteristics.

The Porcelain Insulator Corporation

769 Main Street, Lima, N. Y.

***Warehoused and Distributed by* JOSLYN PACIFIC COMPANY**

2424 FIRST AVENUE SOUTH . . . . . SEATTLE 4, WASHINGTON
180 POTRERO AVENUE . . . . SAN FRANCISCO 3, CALIFORNIA
1523 N. W. KEARNEY STREET . . . . . PORTLAND 9, OREGON
5100 DISTRICT BOULEVARD . . . LOS ANGELES 11, CALIFORNIA

PINCO INSULATORS

Suspension Insulators . . . Switch and Bus Insulators . . . Distribution Clamps . . . Distribution Pin Types and Guy Strains . . . Transmission Line Fittings . . . Tree Insulators . . . Transformer and Circuit Breaker Bushings . . . One Piece and Multi-part High Voltage Pin-Types . . . Suspension and Strain Clamps . . . Indoor Bus Support Porcelain . . . Lightning Arrester Porcelain

• 1920 Thirty Years Service to the Electrical Industry 1950 •

(15) CAPS—A disposable protection for outlet boxes during plastering and painting has been announced by Gedney Electric Co., RKO Bldg., New York 20. The Red Cap prevents plaster, paint or dirt from getting into outlet boxes between roughing-in and finish. It is made of red varnished cardboard in sizes and styles to fit all standard boxes.

(16) INSULATION—Mica Insulator Co., Schenectady, N. Y., has developed a thermosetting laminate called CEE Grade Lamicoid with power factor at 60 cycles of 0.017 for 0.10-kv. crest and 0.019 for 10.00-kv. crest after conditioning for 24 hours at 100°C.

(17) TOGGLE SWITCH—A double-pole, single-throw model claimed to have new features to meet requirements of a variety of applications, has been announced by the Hart Mfg. Co., Hartford, Conn. Listed as Diamond H Model 2160A, the device is compact and working parts are enclosed.

(18) BALLASTS—Sola Electric Co. is offering ballasts for 200-ma. lamps started in sequence and operated in series. These additions to the Sequenstart line are No. 608-208 operating two 96-T-8 lamps and No. 606-208 operating two 64-T-6 or two 72-T-8 lamps. Details may be secured from Department P33, Sola Electric Co., 4633 W. 16th St., Chicago 50.

(19) REGISTER REGULATOR—A model for high-speed wrapping machines, type RR-11 is available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. It was designed to permit a reduction in size of register marks on any generally used wrapping materials. A prefocused optical system is used and no critical adjustments are required to maintain accurate operation, the manufacturer states. The unit is accurate to 1/16 in. over a wide speed range, with line voltage variations as great as plus or minus 10% from normal.

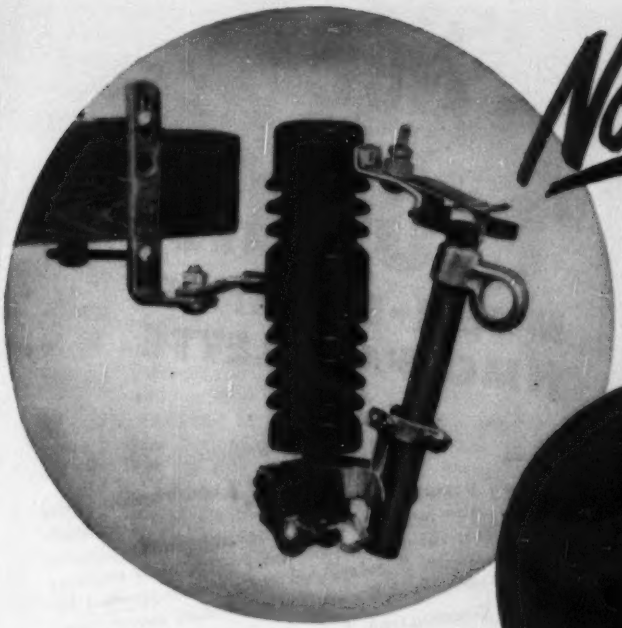
(20) MOTORS—Fractional horsepower, 2-phase, reversible 60-cycle motors for research have been developed by Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Wayne & Roberts Ave., Philadelphia 44, Pa. They are available for applications requiring a low inertia drive motor with power requirements low enough to permit field excitation from an electronic amplifier. Designed for industrial recording instruments, the motor is adaptable where positive positioning by way of a reversible motor is a factor, according to the manufacturer.

(21) STARTERS—A line for all types of fluorescent fixtures has been announced by Dura Electric Lamp Co., Department K, 62-64 E. Bigelow St., Newark 5, N. J.

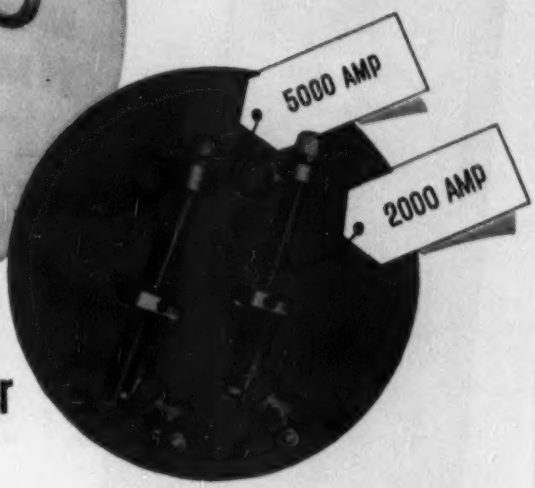
(22) WIRE—Nickel-clad copper is available in round and flat wire, coils or spools; rod from ⅛-in. diameter, from Alloy Metal Wire Co. Inc., Prospect Park, Pa.

(23) DRILL—A new ¼-in. electric drill and accessory kit is offered in special combinations by Fasco Industries Inc., Rochester, N.Y.

(24) TRANSFORMERS—Protected Pole Star transformers (type CSP), equipped with safety devices, have been introduced by Pennsylvania Transformer Co., P. O. Box 330, Canonsburg, Pa. Available from 3 through 100 kva., 14.4 kv. and below.



Now! 5000-amp interrupting rating...



simply by changing fuseholder

General Electric 5.2-kv and 7.8-kv open-drop-out cutouts are now available with a 5000-ampere interrupting rating for high-capacity distribution circuits.

This new heavy-duty cutout is identical with the standard cutout (2000 amp interrupting rating) except for the fuseholder. Standard cutouts already in service can be converted to the heavy-duty rating in a matter of seconds—simply by changing the fuseholders. The same fuseholder is used on either 5.2-kv or 7.8-kv cutouts.

G-E ADVANCED DESIGN ALSO GIVES YOU

GREATER ELECTRICAL CLEARANCE—NO UNNECESSARY FUSE BLOWING Electrical clearances are increased by solid porcelain insulator with cemented-in supports instead of troublesome metal clamps. Mounting support is on *opposite side* of porcelain from all live parts, preventing birds and animals from bridging the insulator and blowing fuses.

INSULATOR PROTECTED AGAINST STRESSES DURING RECOIL Because fuseholder is close-coupled to insulator, recoil force of fuseholder is directed along center axis of porcelain, greatly reducing stresses in porcelain. Shock absorbers prevent impact from being transmitted directly to porcelain.

CONTACTS PROTECTED FROM CORROSION Silver-plated contacts are shielded from weather and protected by factory-applied grease which seals out dirt and prevents oxidation. Hinge guides steer fuseholder into upper contacts and prevent contacts from shifting during wind or pole vibration. The same clean areas on the contacts come together each time, keeping contact resistance low and preventing overheating.

Apparatus Department, General Electric Company, Schenectady 5, N. Y.

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

GENERAL ELECTRIC

New "PLUG-IN" MULTI-BREAKER NMO PANELETTE

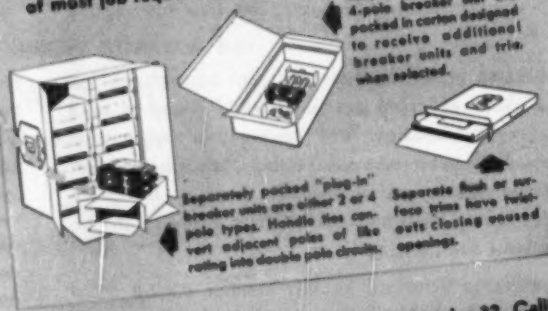
Cutaway showing circular bus bar onto which breaker units are plugged. Twist-outs close openings provided for future use.

"OFF-THE-SHELF" companion to the popular NMO Panelboard, the low cost Panelette meets most A.C. lighting and appliance circuit SWITCHING and PROTECTION requirements. Standardized components stocked by authorized Square D Distributors everywhere.

Construction. Box only 12" W x 4½" D, yet easy to wire . . . door with locks . . . lugs only from 4 to 28 circuits or circuit breaker mains from 4 to 20 circuits . . . 1ø, 3 wire or 3ø, 4 wire . . . flush or surface . . . 15, 20, 30, 40 or 50 Ampere "Plug-In" units interchangeable with NMO Panelboard and MO 12 or MO 20 load centers.

START WITH 4 . . . ADD MORE

Small Stock of Standardized Components takes care of most job requirements



Box, bus structure and one 4-pole breaker unit are packed in carton designed to receive additional breaker units and trim when selected.

Separately packed "plug-in" breaker units are either 2 or 4 pole types. Handle ties convert adjacent poles of like rating into double pole circuits.

Separate flush or surface trims have twist-outs closing unused openings.

Critless THERMAL-MAGNETIC BREAKER UNITS GIVE 2-WAY PROTECTION

Thermal Element responds to heating effects of both load current and surrounding atmosphere. Total temperature is limited to a safe value.

Magnetic Element responds instantly to heavy overloads or shorts.

Both Elements are needed for complete protection!

Write for Bulletin 1600, Square D Company, 4335 Valley Blvd., Los Angeles 32, California

SQUARE D COMPANY

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SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

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San Francisco 4, California

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*Please include your company's name and your position, since we cannot ask manufacturers to furnish literature unless you do.

ELECTRICAL WEST

Reader Service

The editors of Electrical West will be glad to answer questions on engineering techniques; in the lighting and wiring fields; on the electrical code; on merchandising and appliance markets and other phases of the electrical industry in the eleven Western states

Dear Editor:

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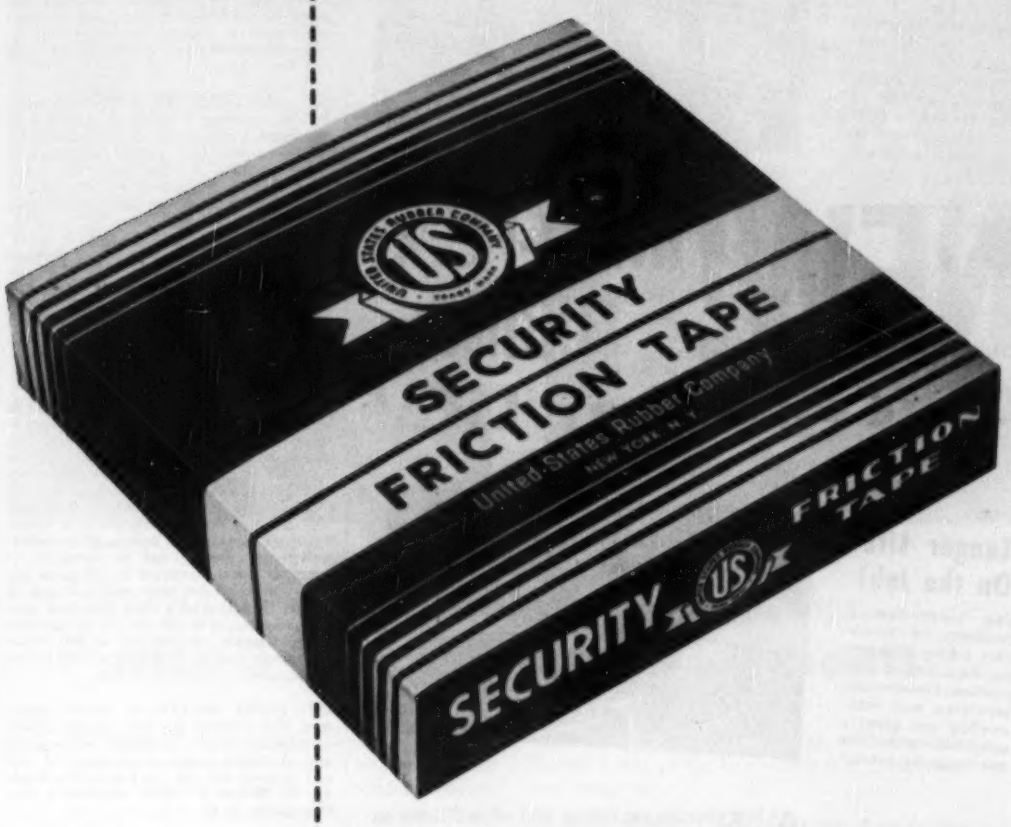
NEVER LETS YOU DOWN!



"SECURITY"—THE FRICTION TAPE MADE BY

● For electrical and general purpose jobs, Security Tape will never let you down. Its adhesive compound is not just sticky, but strong and rubbery. To handle tougher jobs, the fabric is unusually high in tensile strength. Security has no pinholes to cause leaks. Straight-tearing, non-ravelling.

ASK YOUR WHOLESALER FOR SECURITY

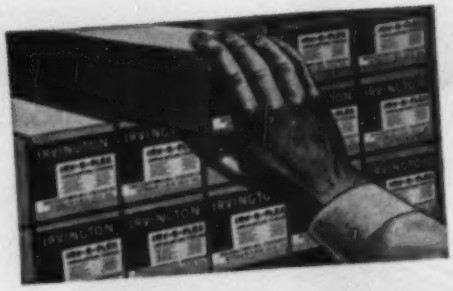
U.S. RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Longer Life On the Shelf!

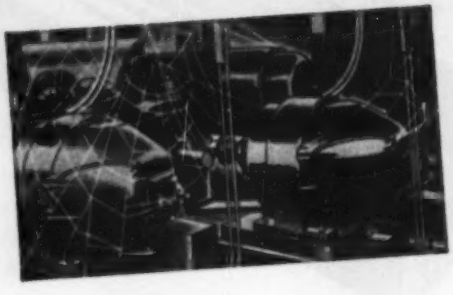
Irv-O-Flex tubing exhibits much greater shelf life! No longer need you worry over "first in, first out" inventory control! Use up Irv-O-Flex tubing to suit your own production scheduling!



NEW! IRV-O-FLEX® TUBING Gives Longer Life!

Longer Life On the Job!

The longer-lasting flexibility of Irv-O-Flex tubing enhances the durability of your products. Disassembly, servicing, and reassembly are greatly simplified with this new longer-life tubing!



At last you can get tubing that *stays flexible* on the shelf, *stays flexible* on the job! Outstanding improvements in resins and processing methods—results of Irvington's unceasing research—have culminated in Irv-O-Flex—a new insulating tubing of greatly extended flexibility. So superior, in fact, are its age-resisting characteristics that you can forget shelf-life worries, forget servicing difficulties, forget replacement troubles!

Irv-O-Flex tubing incorporates a tough, sturdy braid coated with an exclusive new Irvington synthetic resin. Both physical and electrical properties are outstanding. You'll want to test this versatile new tubing yourself—be sure to write for technical data, test reports, samples!

Look to Irvington for Insulation Leadership

IRVINGTON INSULATION

IRVINGTON VARNISH & INSULATOR COMPANY
Irvington 11, New Jersey

(25) SAW—A portable electric hand saw, the Zephyr Model 625, is available from Portable Electric Tools Inc., 320 W. 83rd St., Chicago 20.

(26) SANITARY MOTOR—A splashproof sanitary motor developed by U. S. Electrical Motors Inc., 200 E. Slauson Ave., Los Angeles 54, has screened ends with openings underneath so that water cannot intrude. The company announced a totally enclosed type last year.

(27) ALUMINUM SHEATHING—A method for applying a seamless sheathing of aluminum to telephone and electric power cables has been developed by the Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh 19, Pa. The new method, on which patent is pending, involves the principle of cold reduction, or swaging.

(28) RODDING—A new machine designed to push, pull and rotate flexible steel rods in ducts has been announced by Flexible Sewer-Rod Equipment Co., 9059 Venice Blvd., Los Angeles 34. It will work at speeds up to 100 ft. per minute and will rod 900 ft. in one direction from one location, the manufacturer states.

(29) MAGNETIC AIR VALVE—Square D has a new design principle applying rotary action in a magnet-operated air valve. The rotary design permits high capacity and fast operation in extremely small size, according to the manufacturer. Over-all dimensions of the valve are 4 in. wide, 6½ in. high and 5¾ in. deep. It was designed as a 4-way, 4-port, ⅜-in. valve for control of a double-acting air cylinder; can be converted to 3-way or 2-way operation by plugging the proper ports. Valve cross sectional area is greater than that of a ⅜-in. standard pipe and pressures up to 100 psi. can be handled. It will operate continuously at 300 cycles per minute and at speeds up to 600 cycles per minute on intermittent duty.

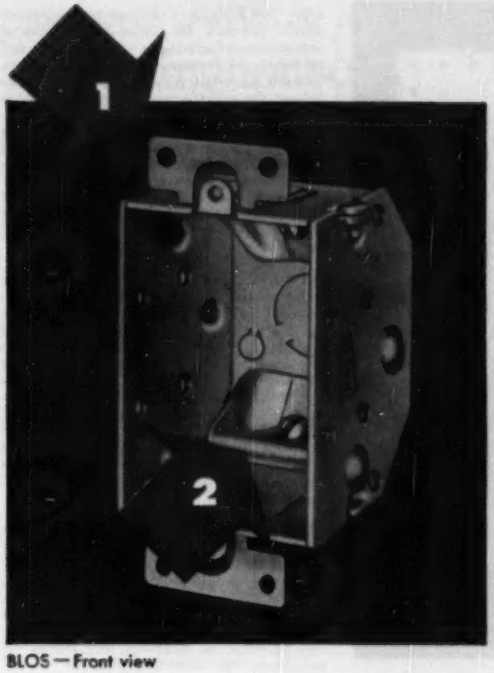
(30) PANEL METER—A 4½-in. instrument with a solder-type zero adjuster allows adjustment without breaking the hermetic seal. A rubber gasket is included for use as a pressure seal for panel mounting. Product of Marion Electrical Instrument Co., Manchester, N. H.

(31) AUTOMATIC SWITCH—Installed at the top of door frame, a new device gives automatic on and off light action. The unit consists of a specially constructed switch, cord and plug; is made by Dor-Switch Co., 5 N. Wabash Ave., Chicago 2.

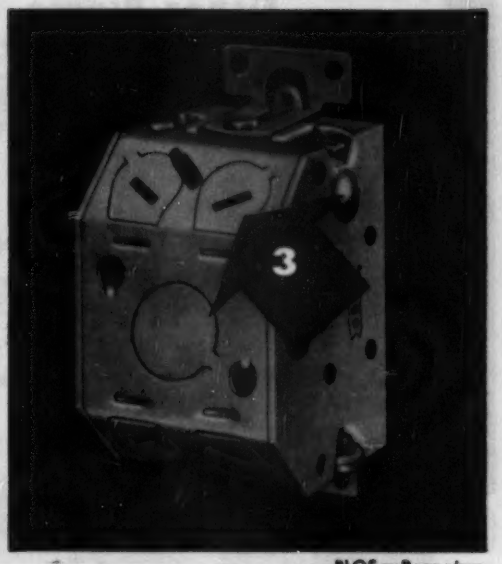
(32) REEL LIFT—Cable reels up to 2,000 lb. are handled with the Reelift, made by HyKon Mfg. Co., 163 E. State St., Alliance, Ohio. Model RL 25 handles reels up to 36-in. diameter and 25-in. over-all width; RL-31, up to 42-in. diameter, 31-in. over-all width. Shipping weights are 60 lb. and 85 lb.

(33) REDUCERS—Single- and double-reduction industrial speed reducers in ratings to approximately 3,000 hp. are available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

(34 CAPACITOR—Type FW 10005 electrolytic capacitor is especially designed for use with photoflash lamps of 900- to 1,000-volt ratings. When four units are used in series-parallel, they can deliver 100 watt-second energy. Made by Cornell-Dubilier Electric Corp., South Plainfield, N. J.



BLOS—Front view



BLOS—Rear view

Here's the nation's most popular switch box . . .
with 3 basic, new improvements

1 First of all, we've given it one-screw ears. And these are built as they should be for a secure mount. They are of heavy metal and slide between long, strong embossments in the box, which hold the ears in perfect alignment. They are adjustable to *all* wall thicknesses. And, of course, the one screw means easier, faster adjustment.

2 Next, we've completely redesigned the clamp to give it firmer clamping action. We've also relocated its screw so that it projects through the bevelled side of the box where it is completely out of the way.

3 Finally, we've relocated the slots in the knockouts so that knockouts can be removed with a single, smooth movement of arm and wrist. We've also broken the knockout circle design to give them flat bottoms for improved cable clearance.

RACO

All this adds up to something even more important than a greatly improved box. It means that in its two styles (with and without ears) it will replace several styles of boxes you have hitherto needed.*

Here's a box to get acquainted with, another of the Raco products that keep Raco's name up front when you are looking for the best.

* BLC, BLCNE, BLN, BLNNE

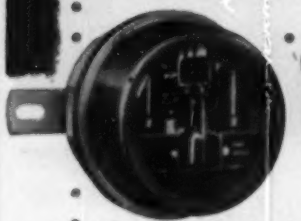
There's a RACO box for every job

ALL-STEEL EQUIPMENT Inc.—800 Kensington Ave., Aurora, Illinois

YOU CAN ALWAYS RELY ON RACO

Fisher-Pierce
Photoelectric Controls

CUT
STREET LIGHTING
COSTS



Series 63300 30 Amp. Contacts

Fisher-Pierce Photoelectric lighting Controls have a continuous record of low-cost service by more than 600 electric utilities in more than 17,000 installations.

Fisher-Pierce should be on *your* "Standards" list. Controls for examination and test can be shipped immediately from stock.

Approved by street lighting engineers and maintenance men throughout the world, Fisher-Pierce units offer a simplified Photoelectric relay for control of multiple or series street lighting systems. Fisher-Pierce controls give you long tube life (20,000 hours or more), easy servicing, (plug-in chassis construction), *no resetting after power interruptions.* In other words, exceptionally *low maintenance costs.*

Series 61300 5 Amp. Contacts

Models available for direct-connected lamp loads up to 3000 watts, for pilot-wire relay systems, and oil-switch controls for series systems.

Ask for Bulletin 63300

The FISHER-PIERCE COMPANY, INC.
41 CEYLON ST. BOSTON 21 MASSACHUSETTS

(35) SOLENOID—G-E has a new short-stroke solenoid for heavy-duty industrial applications, featuring a cast permafil coil assembly. In comparative life tests, the new solenoid operated millions of times before failure, the manufacturer states. Basic component is a paper-layer-wound coil, a type that holds the voltage between turns to a minimum and greatly reduces possibility of failure due to reduced voltage between layers of turns. Available in four models, including strokes of ⅛ in. and 5/16 in. and two stacking thicknesses. General Electric Co., Schenectady 5, N. Y., will give additional details.

(36) RECTIFIER UNITS—New floor- or wall-mounted electronic rectifier units announced by Westinghouse will convert a-c to d-c for general-purpose industrial and commercial applications. Standard units can be supplied with constant or adjustable d-c output voltages, in ratings as high as 230 volts, 87 amp. The adjustable voltage units provide a range of from 60 to 100% of rated output voltage. These units are designed for operation from 115/230 or 230/460 volts, single or three phase. Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

(37) INSULATION—"Rulan" is the trade name of a plastic electrical insulation claimed to be flame-retardant. Its electrical properties, according to the manufacturer, are comparable to, although not the equivalent of, those of polythene. "Rulan" has a power factor over a wide range of frequencies, of 0.002, as compared with 0.0002 for polythene; its dielectric constant of 2.7 compares with that of less than 2.5 for polythene.

(38) WIREWAY—Addition of a 2½x2½-in. flanged-type wireway to its line has been announced by Keystone Mfg. Co., 23328 Sherwood Ave., Center Line, Mich. Produced in 1- to 5-ft. lengths, the wireway is Underwriters' approved.

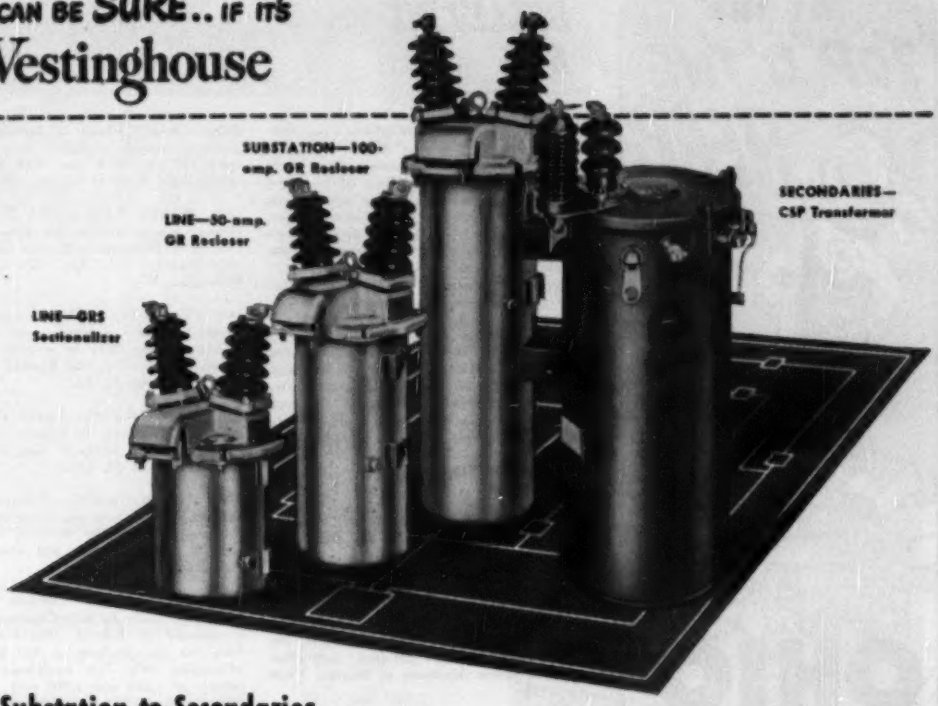
(39) LAMP FOR SPORTS—A new 1,800-watt floodlight for outdoor sports is available from Westinghouse Lamp Division, Bloomfield, N. J. Superseding the previous 1,750-watt lamp, the new one is of the same physical dimensions as the standard 1,500-watt PS-52 bulb lamp regularly used for sports lighting applications and can be used in existing fixtures.

Fill in the Postcards on Page 53

Manufacturers' bulletins are a good way to keep informed. To get more information about new products listed in this section or to secure the bulletins mentioned on page 60, fill in and mail the bottom postcard on page 53.

Information on any department in the magazine can be secured by filling out and mailing the second postcard on page 53. Use this card for asking questions or making suggestions.

YOU CAN BE SURE.. IF IT'S
Westinghouse



From Substation to Secondaries...

COMPLETELY MECHANICAL SYSTEM PROTECTION

...for lower, long-term distribution costs!

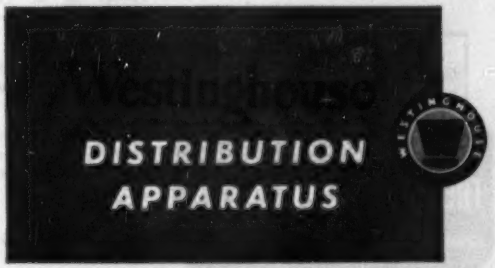
In this case, "mechanical" means a *fuseless* protective system... and one which promises many long-term, cost-saving advantages for rural and suburban lines. Specifically, it's a system which eliminates fuse replacement costs; which stays in proper co-ordination *permanently;* which simplifies the job of re-energizing faulted lines.

Its basic elements are those pictured above. The new Westinghouse GRS Sectionalizer, which is used in place of fuses, is its key component. Co-ordinated with substation reclosers, line reclosers and CSP Transformers, the sectionalizer permits—for the first time—attainment of a completely automatic, mechanical protective system... a *sure* way to gain this important objective:

The highest degree of service continuity at the lowest long-term cost!

The mechanical protective system is one of those analyzed in Booklet B-4700, which covers advantages, limitations and cost considerations of all types of protective schemes for rural and suburban lines. For your copy of this practical guide to better protection planning, write: Westinghouse Electric Corp., P.O. Box 868, Pittsburgh30, Pa.

J-60738



Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

MOTOR AND GENERATOR BRUSHES

For the past thirty-five years we have supplied industry with brushes. The fine reputation acquired during these years merits the statement that OHIO brushes are rated as tops. Brushes for standard machines are carried in stock. Our Engineering Department will help you with special applications.

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ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

BULLETINS ETC.

(40) MINING CABLE MANUAL—An illustrated index is a feature of this new publication of the Hazard Insulated Wire Works Division of the Okonite Co., Wilkes-Barre, Pa. Two complete diagrams of a mine system, showing the electrical cables recommended for every mining application give a cross index to simplify selection. Information and complete dimensional data are given for every type of electrical wire and cable used in or about mines. An engineering data section contains tabular data covering conductor constructions and resistances, current-carrying capacities, copper characteristics and formulas used in figuring cable constructions. Important types of modern mining machinery and cable constructions designed for each are given. A special section is devoted to borehole and shaft cables. A chapter gives splicing methods, with illustrated step-by-step instructions. The 72-page manual is listed as Bulletin H-433.

(41) INSTALLATION BULLETIN—"How to Install Burndy Hyspikes" is the title of a 16-page instruction manual available from Burndy Engineering Co., 107 Bruckner Blvd., New York 54. Prepared for line foremen and installation crews, the booklet outlines step-by-step procedure. The brief text is illustrated with simple drawings and charts. The bulletin will replace previous instruction sheets in future shipments of Hypress Y34A and Y48B.

(42) HOME AIR CLEANER—A new model home Precipitron, designed for straight through horizontal air flow, is described in a 16-page booklet, B-5156, published by Westinghouse Electric Corp., 125 Damon St., Hyde Park, Boston 36, Mass. One section shows how the unit fits into new or existing duct work and electronically traps dirt; another section explains how to operate the Precipitron; a third section covers the technical side.

(43) SOLDERING GUN—A catalog from Weller Electric Corp., Easton, Pa., covers that company's line. Featured is a new light-duty model with dual spotlights to eliminate shadows in the working area.

(44) OIL CIRCUIT BREAKERS—Allis-Chalmers type FZO-151 breakers are treated in Bulletin 71B7045 available from the manufacturer at 939 S. 70th St., Milwaukee, Wis. Featured are a mechanically trip-free pneumatic operator, "Turbo-Rupter" arc-enclosing interrupter, positive high-speed contact separation and an all-welded rigid steel frame. The breakers are available in 69-kv. ratings up to 3,500,000-kva. interrupting capacity, 8- or 5-cycle opening, 20-cycle reclosing.

(45) CONNECTORS—A revised second edition of its bulletin on type M series electric connectors has been published as M2-1950 by Cannon Electric, 3209 Humboldt St., Los Angeles 31. This group of fittings is rated at 250 volts d-c and 600 volts a-c and is listed by Underwriters' Laboratories.

(46) INSULATION TESTERS—Thirteen models of "Hypot" high-potential insulation breakdown testers are described in Bulletin 5A from Associated Research Inc., 3758 W. Belmont Ave., Chicago 18. Mobile and semi-portable models included have capacities from 360 va. to 5 kva, with test voltage ranges from 3,000 to 30,000 volts a-c.

(47) POWER FACTOR—PF correction through use of synchronous motors and condensers is discussed in Bulletin 05B7465 from Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis.

(48) RELAY—Type CO-10 overcurrent relay having extremely inverse current-time characteristics is described in a data sheet prepared by Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

(49) ARMOR — Conductor reinforcement armor is described in Bulletin 10-200 from Preformed Line Products Co., 1051 Power Ave., Cleveland 14, Ohio.

(50) THERMOPLASTIC — Characteristics of Bakelite polyethylene are given in a booklet prepared by Bakelite Division, Union Carbide & Carbon Corp., 300 Madison Ave., New York 17.

(51) SWITCHING — Outdoor metal-clad switchgear made by Allis-Chalmers Mfg. Co. is covered in Bulletin 18B6142A available from the manufacturer at 939 S. 70th St., Milwaukee, Wis. This equipment comes in ratings of 1,200 and 2,000 amp., 5,000 and 15,000 volts, 50,000 to 500,000 kva. interrupting capacity.

(52) ROBOTS—Electronic controls for doors and gates are the subject of data sheets released by Robot Appliances Inc., 13165 Prospect Ave., Dearborn, Mich.

(53) TRANSFORMERS—Dry-type transformers, including open coil and completely enclosed models, unit substations and core and coil units are described in a bulletin from R. E. Uptegraff Mfg. Co., Scottdale, Pa. Sizes range from 0.1 to 2,000 kva.

(54) REGULATOR—A folder on its heavy-duty static-type constant-current regulator has been prepared by Havi Duty Electric Co., Milwaukee 1, Wis., as Bulletin CCR-478. This unit transforms constant potential to constant current for control of series lighting for streets, subways and highways.

(55) SWITCHES—Line drawings and charts give information on sizes, designs and materials available in standard contact blades, lug adapters and insulating separators. Included are details of a kit containing working samples of bushing stock, mounting brackets, contact assemblies and fixtures, fish paper, contact blades, lifters, etc., available from Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12.

(56) INSULATION—A variety of electrical insulation subjects is covered in an 8-page publication, entitled "Insulation Items," published by Insulation Manufacturers Corp., 565 W. Washington Blvd., Chicago 6.

(57) PHOTOELECTRIC EQUIPMENT — A catalog featuring 33 items and giving details of an engineering service is offered by De-Tec-Tronic Laboratories Inc., Department C, 1227 N. Clark St., Chicago 10.

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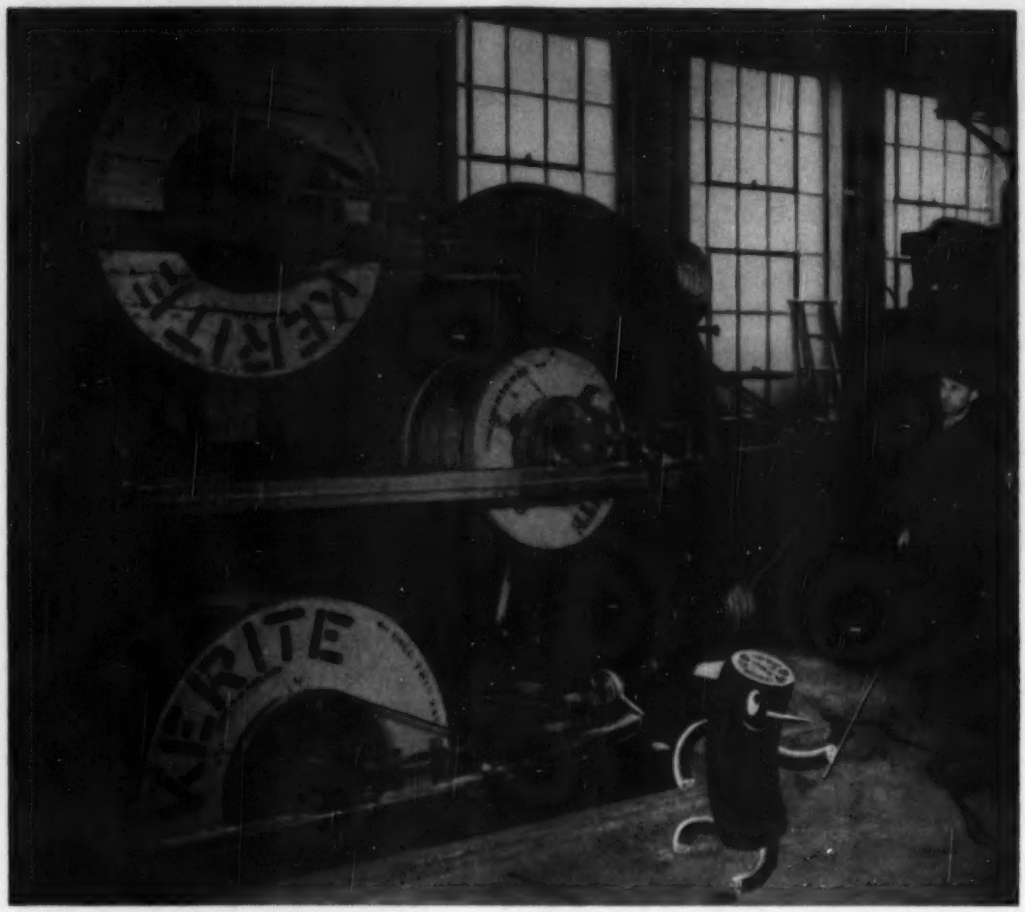

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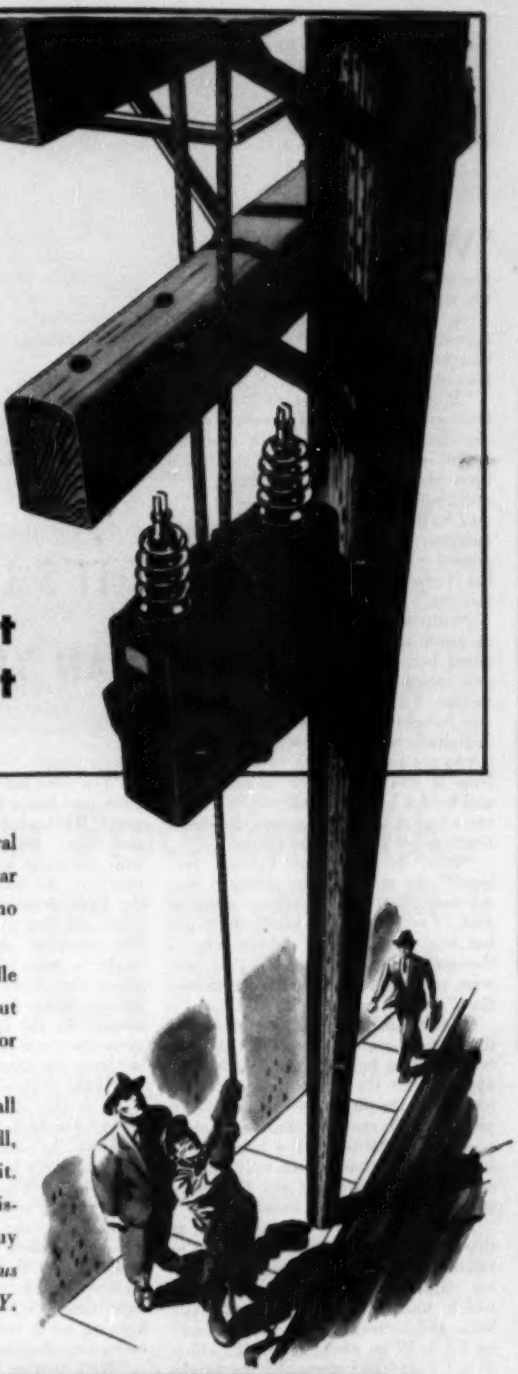

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ELECTRA'S HUSBAND

"WHAT in the name of heaven are you doing?" Electra asked one evening as she walked into the living room and caught me with a yardstick in one hand and a steel tape measure in the other trying to get two dimensions of a new lamp simultaneously.

"If you really want to know, I'm testing a new recipe," I answered without thinking of her possible reaction.

"Sit right down in that chair and keep perfectly quiet," she interrupted soothingly. "I'll call Dr. Goode and he'll be over in just a few minutes. I thought that you appeared queer at the dinner table, but I didn't think it had gone this far."

"Keep your shirt on, I'm not as crazy as you think," I reassured her. "And I am testing a new recipe—a light conditioning recipe. I simply want to see if you bought just a beautiful base and shade with this new lamp or if you got some lighting values as well. Now if you'll sit down in this chair and hold a book, I'll tell you in a minute whether this lamp meets the specifications set forth in the recipe."

"What do you mean lighting recipes?" she asked as she plumped into my easy chair and picked up a magazine. "I've heard of all kinds of recipes but not for lighting. That's why I thought for a few seconds that you were ready for a psychiatric examination."

"You're going to hear a lot about light conditioning recipes in the future," I told her. "It's a totally new approach to the home lighting problem. For the first time in my thirty years in this electrical business somebody has come up with a home lighting program that is not only understandable, but one that any housewife can apply to her own satisfaction.

"Put the magazine down and look at this picture and you will see what I'm talking about. With a 30-in. high senior table lamp like this new one which has a 100-200-300-watt 3-lite bulb, the bottom of the shade should be 17 or 18 in. above the table, which it is," I said as I measured the height with the yardstick. "And the lamp wants to be 20 in. to the left and 16 in. back of the center of the book you are reading. This one isn't far enough back by four inches." So I moved it back on the table just that distance.

"Now you have between 40 and 50 foot-candles of glare-free soft light on the page. Isn't that a simple way of telling whether or not you have an ideal lighting job or just a makeshift?"

"It certainly is," she commented. "Why don't you see if the two new lamps beside the davenport measure up to the specifications of the recipe?"

A couple of quick measurements showed that they did—exactly. So did a floor lamp.

IT'S LIGHTER THAN YOU THINK

"You were fortunate that you bought three new lamps that fit the recipes," I said. "This whole thing is so new that not many manufacturers are ready with the right kind of equipment. If you turn the pages of the booklet to the page devoted to the living room you'll see that in order to conform to the complete recommendation, you ought to have a wall-to-wall valance above the windows. It would house a fixture using fluorescent or lumiline lamps. As the booklet tells you, this gives the room dramatic general lighting from the same direction as the natural light during the day. A peculiar thing is that it also makes the room appear considerably larger than it actually is. As soon as one of the fixture manufacturers is ready with a unit of that type, perhaps we can get one."

"I want to see it first," Electra said. "It has taken me ten years to get those 500-watt heaters that you called floor lamps out of this room. You insisted on keeping the room lit up like a prize fight ring. Nobody liked it and the lighting never really did justice to our furniture, draperies and pictures."

"Well, you've fixed it to suit yourself now, haven't you?" I said. "So it might as well measure up to the recipe."

"How did you find out about this recipe thing?" she asked.

"Some of the fellows in the office heard about it down at the IES convention in Los Angeles," I replied. "Then Gene Commery, one of the chaps at Nela Park, who devised the program, came along and gave us the full story. When I told him about your new lamps he wagered that you had done like most housewives had in the past—bought yourself an expensive lot of bases and lampshades. He'll be surprised to know that what you did find actually complies with the recipe.

"The recipes in the booklet actually are designed for a five-room, one thousand square foot house but they can be adapted to any house, because each room is treated separately. Part of the program is to have 10,000 new houses fitted out according to the specfications by the end of next year. These are to be demonstration and display homes to show the public how simple it is to get a good lighting job and at the same time how dramatic and glamorous good lighting can be. The whole story is going to be told in the November issue of *Better Homes and Gardens*."

"How much is it going to cost?" she inquired. "If these lamps are a sample, I'll bet it will be expensive."

"You're wrong there, too," I said. "In a five-room house the whole job can be done for less than $350. That includes fixtures, floor lamps, table lamps, wall lamps and everything else."

"I thought it would be about a thousand dollars," she commented. "At your figure, I paid enough for this room to do the whole apartment."

"Yes, but you have some beautiful lamps," I said. "And by good luck and the grace of the Lord, you almost have a real lighting installation."

"Up to now, that's just about the way we women had to buy our lamps —with good luck and the grace of heaven," she said. "Maybe with these recipes, it will be different now."

Once the idea catches hold I can see some interest in decent home illumination start to grow even in the cliche conscious department stores sales ladies. It may be too much to hope that the interior decorators will be infected soon. They are so deep in the jungle of dark hues that it may take some time for them to emerge from their self adoration and see the light.

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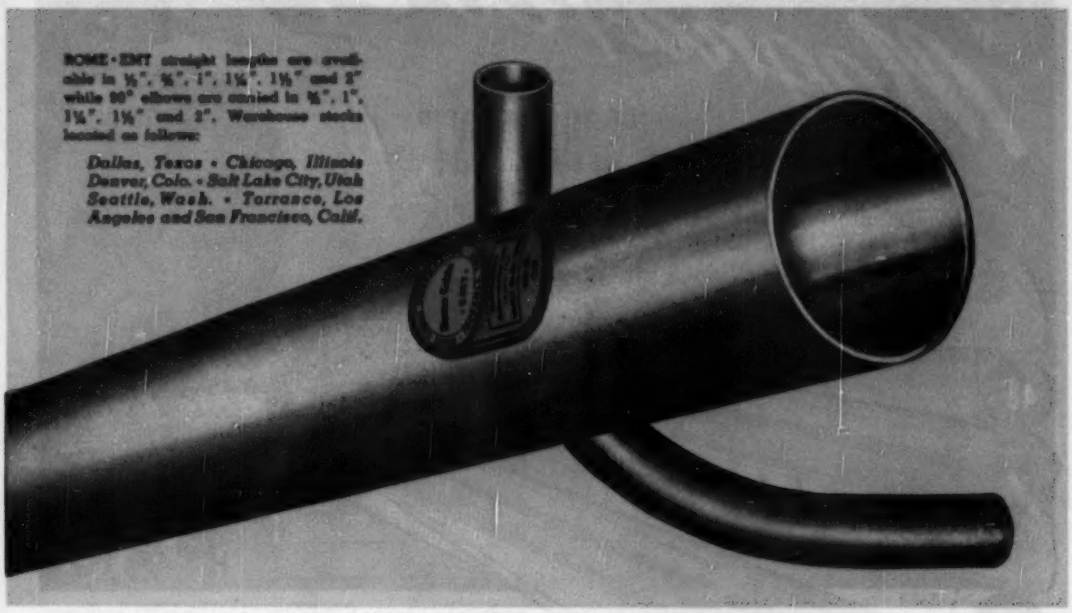
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Modern, streamlined lighting of factories and shops may now be obtained with these new Benjamin "Magna-Flo" Systems designed for use with the new Slimline Fluorescent Lamps. In addition to the many advantages of the new, long Slimline Lamps, these new "Magna-Flo" Systems also bring to the user the many cost-cutting advantages of the exclusive Benjamin "Springlox" Lampholders. Now available in single-pin construction for the Slimline Lamps, these exclusive lampholders have proven their advantages over 4 years of trouble-free operation and actual use in more than half a million Benjamin Units.

Benjamin Porcelain-Enameled steel open-end or closed-end reflectors are standard equipment on all "Magna-Flo" Units. Benjamin "Life-Time" Porcelain Enamel brings maximum savings in yearly cost through sustained light-reflecting efficiency, ease of cleaning and durability.

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BEN 175

OCTOBER 1950 Vol. 105, No. 4

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

Bechtel Corp. Photo

PREPARED FOR MOBILIZATION

With power generating facilities doubled and light metal production and steel making ability increased fourfold since '41 the Far West faces possible all-out defense mobilization with confidence

From whatever angle one views the Western industrial panorama he sees a far different picture of defense preparedness today than he saw in 1941. Four years of World War II plus four and a half years of postwar accelerated growth and expansion finds the region with these assets as the nation begins to mobilize for a possible World War III: a greatly expanded population and hence a greater labor force; a light metal industry that is producing 52% of the country's aluminum supply; an integrated steel industry; new metal-processing facilities; an electric power system capable of handling double the 1940 demands; a reservoir of trained and skilled industrial workers; a diversified industrial base topped by a high percentage of the U. S. aircraft and shipbuilding facilities; and finally, an expanded agricultural production capable of contributing huge supplies to the nation's food requirements.

The situation was far different nine years ago. In 1941 the principal assets were the region's electrical facilities, its raw material resources and its primarily agricultural base. The others are largely new. They give the Far West the industrial stature and maturity that will make the region a potent contributor to whatever defense demands that may be placed upon it.

Having proudly earned the reputation of never being too little or too late in World War II, how does the electrical industry of the Far West stack up today? With the U. S. on trial to prove to the world that her genius, her technology, her management skill and the productive capacity of her workers can turn out the right materials in the right amounts at the right time, how ready for the job is the light and power industry here in the West?

In December 1941, the power systems of the Far West had an installed capacity of 6,849,160 kw. By December 1950, Western power generators will total 12,216,517 kw. Thus in the intervening nine years 5,367,357 kw. of new generating facilities have been added. With the 1951 assured new capacity additions of 1,447,750 kw., the increase over the ten-year period will exceed 100%.

What degree of mobilization is this huge reservoir of electric power capable of serving? While the answer varies from region to region, one generalization is significant. There is ample power for any all-out mobilization that would accompany a third World War. This is true because curtailment of normal civilian production would offset war-created demands. And if this was not sufficient, then war loads would take precedence and the public would get what was left. In the case of all-out mobilization, industrial plant productiveness and the size of the labor force would unquestionably be the determinants of Western war production, not electric power. As in World War II, plants would work around the clock; hence energy consumption rather than demand would expand. Load factors would return to the World War II figure of 75-80%.

Partial mobilization with the possibility of the introduction of new and large high-load-factor chemical or metallurgical industries changes the picture. In this case present and near future power potentials in the various areas would influence plant location. Both the Pacific Southwest and the Intermountain areas have ample and near-future power supplies. The reverse is true in the Pacific Northwest, where a postwar power deficiency still exists and where there is little hope of correction before 1952 and with no

READY

THE Pacific Northwest power supply problem is one of generation, responsibility for which has been assumed by the federal government. Availability of additional power is largely dependent upon the speed with which federal hydro projects now under construction are brought into service. Until then, an energy deficiency will continue to threaten. Any move to bring large, high-load factor industries into the region before additional power is available will have to be made on the assumption that at least average water conditions will prevail. A critical water period, with or without defense mobilization, will necessitate a region-wide program of curtailment. Assuming that materials are available, our own construction program will continue unabated, accelerated if necessary to handle defense industry requirements.—*James H. Polhemus, president, Portland General Electric Co.*

DURING the 1940-45 period we were able to take care of the additional war loads placed in this area without curtailing either war loads or normal loads. After a war-end shutdown the aluminum plants in the Northwest were brought back into production and today are taking almost 750,000 kw. This, together with the increase in other loads, is now absorbing the entire output of the region. The federal projects do not expect to have any surplus power prior to 1954, which means that little, if any, high-load factor industry can be placed in the area in any new defense mobilization program. Some of the non-federal utilities are willing to build projects that could be brought in before 1954, but to make this possible would require high priority ratings for the projects and a more sympathetic attitude on the part of federal agencies.—*Kinsey M. Robinson, president, Washington Water Power Co.*

AT the beginning of World War II the Department of Water & Power had a peak generation demand of 485,000 kw. and a maximum generation capability of 674,000 kw. In December 1950 it is estimated that these figures will be 875,000 kw. and 1,114,000 kw. Thus the margin between peak and capability has increased from 189,000 kw. in 1941 to 239,000 kw. in 1950. In addition the department has under construction or on order 312,500 kw. of new capacity. Thus the department is even better prepared now to meet unusual load demands of defense production than it was in 1941. Today compared to 1941 the fuel supply problem of electric utilities may become more acute than it was during 1941-45 because of the greatly increased dependence on steam generated energy.—*Samuel B. Morris, general manager, Los Angeles Department of Water and Power.*

UTAH Power & Light Co.'s service area faces the threat of World War III with twice as much electric power available for one-third more people than we had when World War II threatened ten years ago. In addition our company has a 66,000-kw. steam electric station under construction and a 75,000-kw. steam station on order. Utah Power & Light has assumed the responsibility of supplying its service area with adequate electric power for both peacetime and wartime economies.—*George M. Godsby, president, Utah Power & Light Co.*

IN the defense mobilization program the Montana Power Co. is prepared and ready to supply adequate power to operate at capacity the vitally important copper, zinc, lead, manganese and phosphate mining, smelting and refining industries in Montana. We are ready and able to supply the many oil refineries, sugar beet factories and electrified railroads all the power they want. In addition, in cooperation with BPA, we are planning to supply a new phosphate plant and a new aluminum plant the power they require, and there is a reasonable probability that we will have surplus energy to send to Washington to help out in that area. In World War II we had considerable surplus power. This war will find us equally well prepared.—*J. E. Corette Jr., vice-president and asst. gen. manager, Montana Power Co.*

assurance of any surplus before 1954.

In the area served by the Southwest Power Pool present estimates of peak demand for 1950 are of the order of 5¼ million kw. with more than 6¼ million kw. of capacity available. Almost 1 million kw. more will be added to the pool in 1951. It is noteworthy that Pacific Gas and Electric Co. carried its 1950 peak of 2,519,000 kw. with 476,000 kw. of generation in reserve.

In the case of the Northwest Power Pool which includes Utah, Idaho and Montana, 1950 peak demand is expected to exceed 4.3 million kw. Capacity of the pool by December will be approximately 4.7 million kw. However, all of the reserve is in the Utah-Idaho-Montana area. The western half of the pool suffers from a sizable capacity deficiency. The 1950-51 additions to the Northwest pool will total 960,000 kw.

The Pacific Northwest Utilities Conference Committee, consisting of representatives of the principal investor-owned and municipal utilities in the region, has been pressuring the federal government not only to speed up present power programs but to take favorable action on some of the non-federal projects which might be completed in two years or less. One of these is the Cowlitz River development of the city of Tacoma capable of producing 460,000 kw. It has been hanging fire for two years. An FPC hearing has finally been scheduled for October. Another is the Deschutes project proposed by the Pacific Power & Light, Portland General Electric and Washington Water Power. This development has apparently been killed as the result of action by the Oregon State Fish Commission in denying a permit.

Some exploration is being done on possible cooperative steam electric generating facilities in the Northwest. Such a plant could be completed in 18-24 months. It would firm up a sizable block of Columbia River power as well as help to alleviate the present deficiency. Fuel cost is a limiting factor. The Northwest is primarily a hydro region. Power schedules are largely set by BPA's $17.50 per kw.-year rate. Fuel-generated energy is at a decided disadvantage competitively.

Individual power situations for the entire West are the subject of executive comment which accompanies this article.

Comparable to the increase in power capacity, and to some extent because of it, is the expansion of the metallic base which today underlies any Western defense mobilization. The Northwest produced 312,000 tons of the total 1949 U. S. aluminum production of

603,000 tons. The 1950 proportion will be greater. In the case of steel, production has jumped more than fourfold. In 1940 Western mills turned out 1,038,000 tons. The 1950 production will exceed 4,380,000 tons. Even so, this is still considerably short of the 5,000,000 plus ton annual consumption of the region.

Availability of metal supplies has brought a sizable increase in the variety and number of metal processing plants in the area. This and the chemical processing categories show the greatest expansion during the 1940-50 decade.

Considerable concern is expressed from time to time regarding the fuel resources of the West, especially oil and gas. It is true that World War II put a heavy drain on the West's oil industry. Also postwar demand skyrocketed. So too did development and prospecting. The result has been that supply eventually caught up with demand. During part of 1949 as many as 10% of the region's oil wells were shut in.

Expanded supplies of natural gas have altered the fuel outlook. Two lines from Texas will give California ample gas fuel to supplement local resources. The dearth of fuel in the Pacific Northwest may be overcome in the foreseeable future. Plans have been projected to bring Texas Gulf gas to that area and there has been a recent marked step up in interest in a line from the mid-Canadian fields to the coast. Additional gas supplies have been developed for the Intermountain region.

Finally there are the huge coal reserves of the Far West, especially in the Rocky Mountain states which can supply any potential fuel emergency. It is significant that most of the California steam-electric generating plants built since the war have been designed to burn coal in place of oil or gas. The fuel shortages of World War II dictated this course. However, it is equally noteworthy that even when fuel oil prices were at their peak of $2.30 per bbl. oil enjoyed an 18% differential over the cheapest coal that might be delivered into California.

Any consideration of the defense mobilization potentials of the Far West must necessarily take into consideration other factors than those covered in this brief analysis. Purpose of this has been to show the degree to which the electrical industry here in the West is prepared for any and every emergency that might develop as the mobilization for a possible World War III proceeds. The answer is positive—the industry is ready and able to assume whatever responsibilities are placed upon it.

. . . . . AND ABLE

YOU ask whether the industry in this region is prepared to do the kind of job it performed between 1940 and 1945. The question assumes a state of facts, the accuracy of which I seriously question. Even should the dreadful disaster of war continue with us, I seriously doubt that the expansion demand for power in this area would follow a pattern similar to that from 1940-45. I do not believe that it is economically possible or desirable to continue the present excessive and abnormal civilian consumption, and to superimpose on that whatever additional demand results from war. Instead, I anticipate in the event of war, substantial reduction of construction activity, passenger automobile production, furniture manufacture, etc. Regardless, however, of what the pattern of demand may be during the next four or five years, I should say that this area is as well or better prepared to meet the demand than it was in 1940.—*W. C. Mullendore, president, Southern California Edison Co.*

WE in the Western group utilities of the Northwest Power Pool are already strapped for power for peacetime civilian requirements, so great has been the load growth since World War II. Although the continued maintenance of the pool has, through various diversities of supply and use, added something up to 600,000 kw. to our resources, there have been various times when summer floods or winter low water have forced us to use industrial as well as residential curtailment measures. We are now urging the government to be most careful about imposing high-load-factor defense plants on this area until new large generating capabilities are provided through both federal and non-federal projects. We expect to be short of power for several years—much shorter much sooner if we are called upon to energize war plants.—*C. A. Erdahl, Commissioner of Public Utilities, Tacoma.*

THE light and power industry in our area is better prepared today to meet the demands of a defense mobilization than during the early 1940s. Approximately 150,000 kw. of new steam generating capacity has been installed since 1948 by the utilities serving Arizona. Today we are not largely dependent on hydro resources as was the case in 1940. The utilities today are better organized to meet an emergency, men are better trained, mechanization is better and improved construction methods will do a better job faster.—*Henry B. Sargent, president and general manager, Central Arizona Light & Power Co.*

THE industry in this region is in a far stronger position now than it was in 1940, and its construction program over the next three years is designed to strengthen this position still further. We have been engaged since the war in a program of extraordinary expansion to meet rapidly growing demands for service and to provide adequate margins of reserves. The success of this program is attested by the substantial reserves, amounting to approximately 19% reported by this company when it carried its record-breaking peak a few weeks ago. This peak was 2,519,000 kw., 1,393,000 more than in 1940. Since the war this company has spent over $600,000,000 for new plants on its system and expects to increase this amount to approximately $1,000,000,000 before the end of 1954. These figures speak for themselves.—*James B. Black, president, Pacific Gas and Electric Co.*

AT the close of the last war Public Service of Colorado had 194,000 kw. of generating capacity. Upon completion in 1951 of power plants presently under construction, we will have a generating capacity of 380,000 kw., an increase of 96%. There was no shortage of power on our system during the last war and consequently, we will be in a position to handle a substantially greater war load in the event of another defense mobilization.—*J. E. Loiseau, president, Public Service Co. of Colorado.*

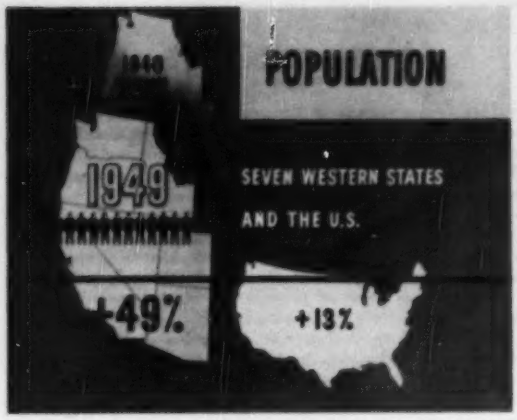


Fig. 1. Population in the West had increased at a phenomenal rate

Fig. 2. Increase in California employment is typical of the West

The Rising Tide of Western Industry

Average plant's workers account for yearly sales of $250,000

Alden G. Roach*

The West seems destined to become one of the nation's great manufacturing areas. Recent growth has assured that fact. Even before the war there was a steady, long-term trend upward in population, income, employment, and industrial development. The trend was accelerated during the war. At the end of the war the West was steeled for a blow that did not come. Even the U. S. Employment Service predicted that unemployment would increase significantly on the Pacific Coast. Just after V-J Day some of the predictions seemed justified. Shipbuilding employment collapsed. Aircraft employment nosedived.

Then things started to happen that ruined all the pessimistic prophecies. New people kept arriving. Some migrants, who had left the coast right after the war, returned. The West saw one of the greatest migrations in history. Between 1940 and 1949 the population of seven Western states grew from 11,500,000 to 17,200,000, an increase of 49%. The nation as a whole gained only 13% during the same period. This is shown in the graph of Fig. 1. Fig. 2 shows a comparison of total employment in California and the nation. Employment in California rose 54%, while the nation's employment rose only 22%. California is typical of what has happened on the West Coast.

After the war, industry converted to peacetime production. Existing plants expanded and new plants were built. Eastern firms came west to establish branch operations to feed an expanding Western market. Trades and services, starved for help during the war, began to rebuild their forces. Thus the increased work force available in the area was absorbed. Industrial development had been uneven, however, during this period. This is to be expected in any rapidly growing area. Obviously the business activities that appeared and expanded in the West were those that found an economic advantage here. Other firms found it more advantageous to continue supplying this market from existing plants—at least for the time being. But still others are not participating in this market because their managements have been unaware of the newly opened opportunities in this region. They are far greater than they have ever been before.

During the past ten years the Western iron and steel industry has expanded production and jobs at a more rapid rate than either Western population or industry as a whole. Growth of steel ingot capacity on the Western slope is shown in Fig. 3. Since 1920, steel ingot capacity has increased more than eight times—from 515,000 net tons to 4,380,000 in 1950. Location of steel mills and blast furnaces on the Western slope is shown in Fig. 4. It will be noted that all areas have shared in the expansion of the steel industry. In Fig. 5 is shown the source of the steel consumed in the Western market. Taking the average for the five prewar years, 32% of the steel consumed in the West came in by rail and 41% came in by ship. Only 28% was produced by Western mills.

In 1948 Western mills produced 56% of total local consumption, twice the share of prewar years. This is shown in Fig. 6. Consumption had more than doubled, but local production had increased 4½ times what it was prewar. Expressed in tons, total Western consumption of steel prewar was approximately 2,200,000 tons, and in 1948, approximately 5,000,000 tons. Hence it is likely that local availabilty of steel mill products will continue to grow provided other industry grows with it.

The economics of plant location presents an ever-shifting scene. What was uneconomic for this area ten years or even five years ago, may not necessarily be so today. Western markets for all kinds of goods have expanded rapidly since the war and are continuing to expand today. The growing market potential is adding constantly to a growing list of industries feasible for this area. The national trend toward decentralization, which has been given impetus by growing transportation

* President, Columbia Steel Co. and Western Consolidated Steel Co., San Francisco. Article is based on a paper before the AIEE convention at Pasadena, June 12-16, 1950.

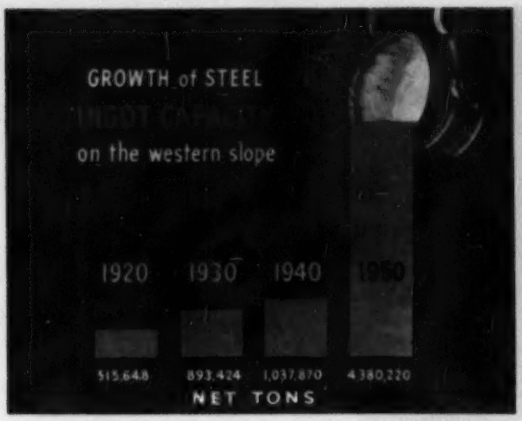


Fig. 3. Western steel capacity increased four times in a decade

Fig. 4. Steel production on the Western slope is well diversified

costs, is aiding industrial growth in the West. The new population includes large pools of skilled workers who were not available previously.

The expanding basic heavy industries are offering local supplies of raw materials available for manufacture. Basic aluminum alone has made possible hundreds of local manufacturing operations here which were not thought of before the war. The new basic industries not only make possible, but often require a host of satellite industries. They also require a network of suppliers of services and products of all kinds. Shorter supply lines between factory and user are needed today because distributors are loath to carry large inventories, and are demanding quick deliveries from the factories. In seeking the further development of the West, we want a balance that fits the nature of our economy. We should not be too concerned about the lack of certain types of industries which for the present do not fit economically into our industrial pattern.

It should be made clear that industries cannot be expected to locate among us without having a high degree of investment confidence in our future. Plant location decisions rest upon exhaustive analyses of markets, buying power, natural resources, labor supply, distribution facilities and other supporting inducements. One of the nation's largest automobile manufacturers—who, incidentally, operates on the West Coast—recently estimated that every newly created job costs that industry a minimum of $10,000—and this may even be exceeded in industries requiring heavy equipment and skilled workers.

The West stands to gain handsomely when it succeeds in attracting a new industry into the community. It is estimated that an average plant employing 150 workers in a community represents approximately $500,000 in manufacturing investment, and accounts for an estimated yearly sales of a quarter of a million dollars. At the same time this plant supports, not only the workers and their families, but nearly 400 occupied homes, 33 retail stores, 320 automobile and service facilities, 24 professional people, 18 school teachers and other essential sources of service and supply. This gives a rough idea of what a new plant can mean to a community.

I am optimistic about the future. However, I believe we must face realistically the fact that we have some obstacles in our path. We are industrially immature. The lack of many types of satellite industries inhibits our growth. We have an impending shortage of water in some parts of our area that looks very serious. We have internal transportation problems brought about by the vast distances between our population centers. But these obstacles will not stop the growth of this area. We will solve these problems just as we have solved equally difficult problems in the past.

Fig. 5. Prewar the West produced only 28% of its steel requirements

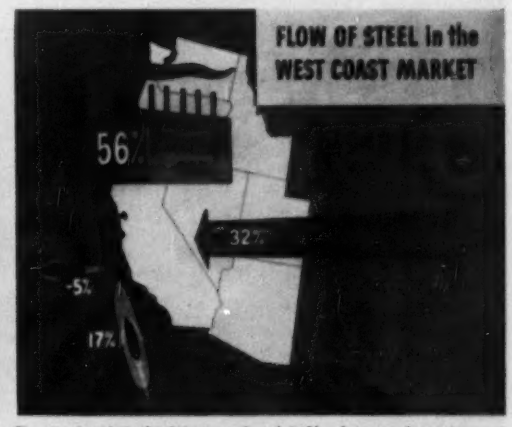
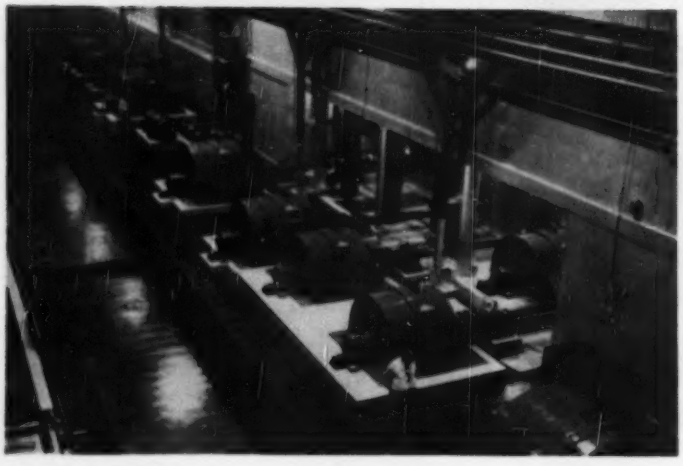


Fig. 6. In 1948 the West produced 56% of its steel requirements



WEST'S OUTPUT

Western slope production in 1950 will reach 4.38 million tons

Steel has become a dominant factor in the economy of the West. The West has witnessed an amazing expansion of its steel-producing facilities. Steel ingot capacity on the Western slope increased from 1,037,870 tons in 1940 to 4,380,220 tons in 1950 — an increase of four times. In 1948, the West produced 56% of its steel requirements. Only 28%, or half of Western requirements, was produced prewar.

There are four major steel producers in the West. U. S. Steel operates through three subsidiaries — Columbia Steel, Geneva Steel and Western Consolidated Steel Co. Bethlehem operates as Bethlehem Pacific. Kaiser is an independent producer. Then there is Colorado Fuel & Iron at Pueblo, Colo. All have under way, or have completed, large expansion programs.

Columbia Steel Co. will increase its cold rolled sheet steel and tin plate facilities at its Pittsburg, Calif., plant during the next year by approximately 215,000 tons annually.

Geneva Steel Co. will build a new hot rolled sheet mill to produce 100,000 tons annually. Completion is scheduled for summer of 1951. When completed, the two new facilities will have annual production of 640,000 tons of sheets and tin plate. In addition, the company is actively studying new facilities which will be added to its Los Angeles plant in the near future.

Bethlehem Pacific's three steel plants in Seattle, South San Francisco and Los Angeles are now operating at more than 100% capacity. The company's multi-million-dollar expansion and modernization program embarked upon after the war has resulted in a

Blast furnaces of Colorado Fuel & Iron Corp. (upper) present a display of fireworks as they are tapped periodically. Center: new fabricating plant of Bethlehem Pacific Coast Steel Corp. at Seattle is part of postwar steelmaking expansion. Lower: Drive motors for Morgan rod mill of Colo. Fuel & Iron, Pueblo

STEEL EXPANDS

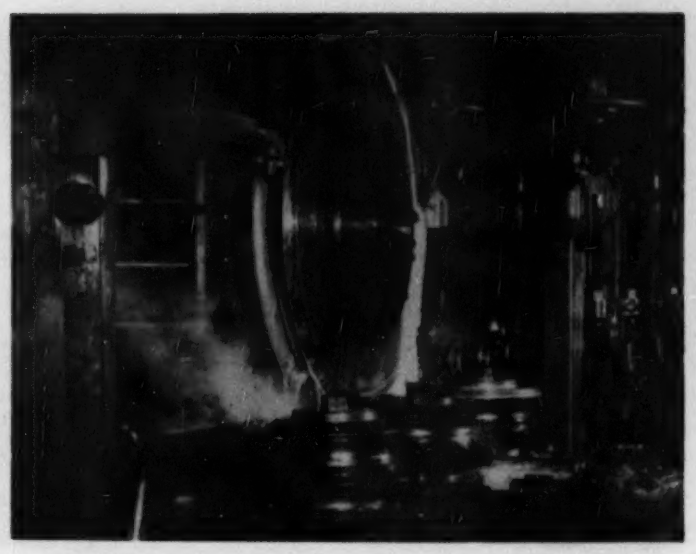
Four major steel producers all are spending millions for new facilities

vast increase in steel-making capacity and a wider range of steel products. With two new electric furnaces and expanded processing facilities at its Los Angeles plant, enlarged open-hearth and improved rolling facilities at its South San Francisco plant, and a new fabricating works at Seattle, Bethlehem has greatly improved its position to meet the new demands of the rapidly expanding Western steel market.

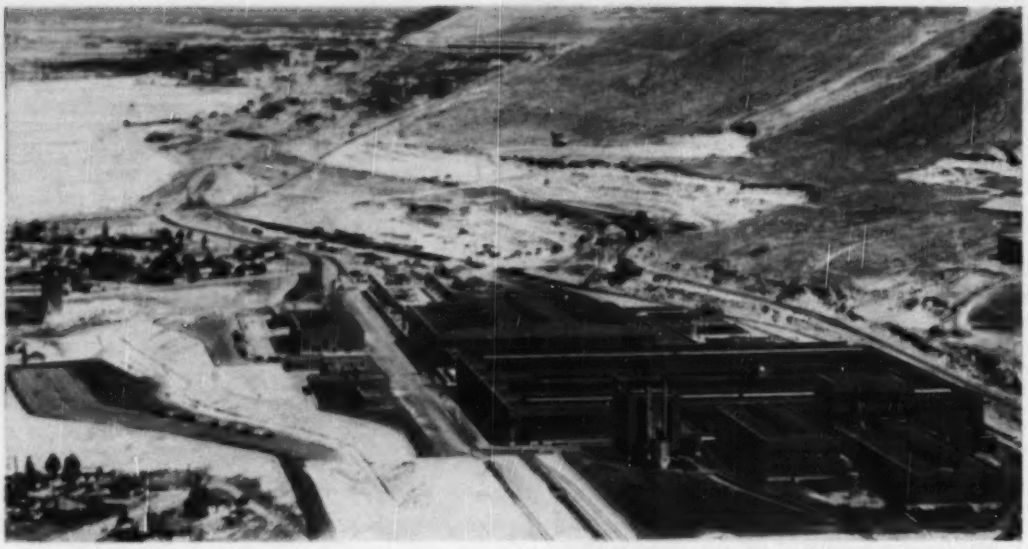
Kaiser Steel Co. at Fontana, Calif., has a fully integrated steel mill producing 1,200,000 tons of steel products annually. Most recent addition to its facilities is the new Yoder electric weld continuous pipe mill illustrated. This has a capacity of 220,000 to 250,000 tons annually of 5 9/16-in. to 14-in. OD pipe. Other facilities at Fontana include a continuous butt weld pipe mill with annual capacity of 100,000 tons of ½-in. to 4-in. black or galvanized pipe.

Colorado Fuel & Iron Corp. at Pueblo, is the oldest large steel producer in the West. Works at Pueblo produce in excess of a million tons of steel products annually and are now running at 100% of capacity. The company makes a wide range of products including railroad rails to welded fabric and chain-link fence. The company's greatest expansion is the recently completed Morgan rod mill, illustrated. At present the welded wire fabric department is being expanded.

Steel production in the West represents a load of approximately 350,000 kw., two-thirds of which is purchased power. Electric drives, electric controls, electrical processes, measuring and testing devices, have contributed tremendously to improving the efficiency and quality in steelmaking.



Yoder pipe mill (upper) is latest facility to be added by Kaiser Steel. Center: aerial view of the Kaiser plant at Fontana, Calif., now producing 1,200,000 tons of steel products annually. Lower: output of Columbia Steel's tinplate mill at Pittsburg, California, will be increased by 215,000 tons annually



New Kennecott $16 million electrolytic refinery gives Utah its first integrated copper operation. Power requirements are 25,000 kva.

Integrated Copper—

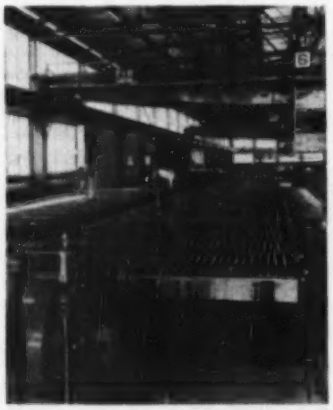
Utah now has its first electric copper refinery, built at Garfield by the Utah Copper Division of Kennecott Copper Corp. Completion of this new plant at a cost of more than $16 million permits performing in Utah all four major steps in producing copper—mining, milling, smelting and refining. For the first time in the state's history electrolytic copper will be available for sale in Utah to serve Middlewest, Intermountain and Pacific Coast markets. The refinery's pay roll for some 700 new jobs and supply purchases, freight and tax payments will make Utah Copper Division's operations an even more dominant factor in the state's prosperity.

The new plant will have an initial capacity of 12,000 tons of refined copper per month, and ultimate capacity of 16,000 tons monthly. The ten buildings that make up the new refinery cover an area of approximately ten acres. The largest of these, the tank house, covers some 225,000 sq. ft. and houses 1,346 electric cells, motor generator sets, and other auxiliary equipment. In conjunction with the refinery, a new anode casting plant, costing $3½ million has been built by the American Smelting and Refining Co. at its nearby Garfield smelter. Final product here will be anode shapes suitable for treatment at the new refinery. The anodes will be received from the smelter in carload lots, placed in the electric cells where they are alternated with cathode starting sheets. About 28 days are required to corrode an anode during which two cathodes are produced, requiring about 14 days each. Cathodes are removed from the tanks by overhead cranes, washed and transported to the adjoining casting building, where they are melted in two electric arc furnaces and cast into wire bars, ingots, and ingot bars for sale.

During the electrolytic process the impurities, including small amounts of gold, silver, and some other by-products, settle to the bottom of the cells in what is called the anode mud, or slimes, with a small amount of the anode mud collecting on the remaining parts of the anodes. At the end of the 28-day cycle, after the second lot of cathodes has been taken from the tanks, about 15% of the original anodes remain. These are washed as they hang in the tanks and are then sent to a third electric arc furnace in the casting building for remelting and recasting into new anodes for use in the refinery process.

Power for the new refinery is supplied from the company's 100,000-kw. steam plant through a 25,000-kva. transformer bank. Six m-g sets convert 12,000 kw. to d-c.

Normally Utah Copper Division supplies approximately 30% of the new copper produced in the United States and the refinery will treat about one-half of its present output. The remainder will be shipped to the Baltimore and Perth Amboy plants of the American Smelting and Refining Co. Except for a small quantity sent to its Tacoma, Wash., plant, the two eastern plants had previously refined Utah Copper's total production.



Electrolytic copper cells use 16,000 amperes

Circled areas indicate ore bodies in Greater Butte Project that will add 130 million tons to U.S. copper reserves by block caving mining

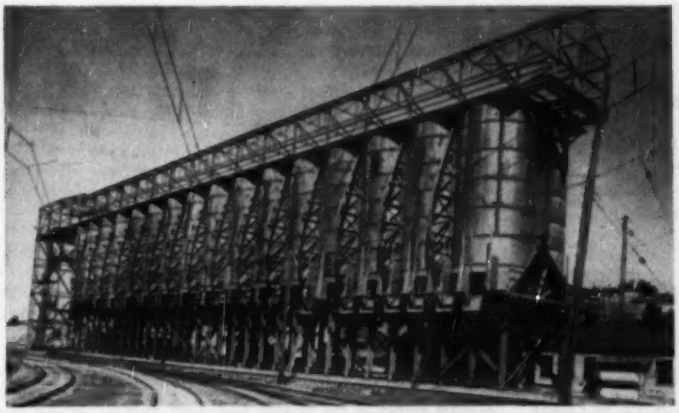
New Copper Reserves

Of great economic significance to the West are new mining developments at Butte, Mont. One hundred and thirty million tons of copper reserves will be added to resources within the United States by revolutionary new mining operations of the Anaconda Copper Mining Co. The Greater Butte Project, as it is known, will utilize the block caving method of mining low-grade ores. The new development will supplement, not replace, present mining in the Butte district. Certain previously known copper ores will be mined by the low-cost block caving method.

Eleven ore zones above the 3,400-ft. level containing from 2,000,000 to 60,000,000 tons each will be mined. An average of 20 lb. of copper per ton of ore will be recovered together with substantial precious metal credits. Access to the ore bodies will be through the Kelley shaft at the ore bins shown. The shaft will be of large cross section of fireproof design. A headframe and 3,000-hp. Allis-Chalmers hoist with 12-ton bottom dump skips will be installed. The underground haulage system will be virtually an underground electric railroad hauling 100 tons per train in five-ton cars with ten-ton trolley locomotives. The Anaconda mill will be remodeled to enable it to treat the additional ore tonnage developed. Work has been under way since 1947 on the $20,000,000 project. Work will have progressed by the latter half of 1951 to permit the mining of 5,000 tons of ore per day. By late 1952 it is hoped to reach the full capacity of 15,000 tons daily.

C. F. Kelley, Anaconda's board chairman, has said, "For the first time, through the Greater Butte Project, with the carefully estimated tonnages known to be available for the production of copper from low-grade ore, there is now the assurance of a longer period of activity than it has been possible to state positively at any preceding time. . . . The application of hydroelectric power has greatly expanded and made possible progress which otherwise could not have been achieved."

Power is supplied to Anaconda Copper Mining's entire operations by Montana Power Co.



Immense ore bins at main Kelley shaft will store copper ore enroute to Anaconda smelter

Aluminum Wire Mill

The Aluminum Company of America has recently placed in operation a new rod, wire and cable mill at Vancouver, Wash. This new $5½ million operation is located adjacent to the company's Vancouver reduction works where five pot lines have been in operation since 1950. The new wire mill will produce a complete line of wire and rod products, including ACSR conductor. It represents the first major fabricating plant in the Portland area using pig aluminum produced by a reduction plant in that territory. The plant has a nominal capacity of 2,500,000 lb. of cable per month, and will employ 250 persons on a three-shift basis.

Production at the mill starts with aluminum ingot, supplied by the nearby reduction plant. A semi-continuous mill rolls the ingots into a wide range of finished and semi-finished products such as bars, rods and bar stock. Coiled round rod is made for wire drawing. Aluminum wire is drawn on conventional equipment. The rod is first broken down on block-type machines. Tandem-type machines then draw the wire down to the desired size. The mill also has stranding machines that produce all sizes of ACSR conductor as well as all-aluminum cable.

Situated to better serve the West, the Vancouver mill was intended as a relocation of Alcoa's rod, wire and cable facilities rather than an increase in facilities. Some of the equipment at Vancouver was transferred from Alcoa's plant at Massena, N. Y. Although there will be no fixed division of territory between the plants, the Vancouver mill may occasionally ship as far east as the Mississippi River.

Plans for a $500 million industry by the Aluminum Co. of Canada to produce 600,000 tons of aluminum per year are well under way. A hydro project on the Nechako River would develop 1,500,000 hp. Site is in the northern part of the Province of British Columbia

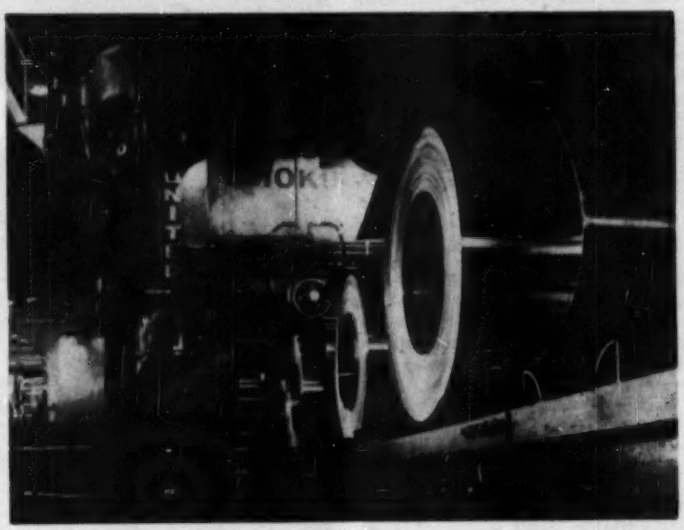
Pacific Northwest Aluminum Industry

Reynolds Metal Co. plant at Troutdale, Ore. is a large Northwest aluminum producer

The Pacific Northwest has been producing about half of the U. S. output of primary aluminum. In 1949, out of a U S. total of 603,000 short tons, the Northwest produced 312,000. Expansion of another 250,000 tons or more has been prevented in the area for the past three years by the power shortage. Meanwhile, about one-sixth of the capacity is being operated on interruptible power, subject to shutdown whenever the water flow through the dams of the Columbia River system is insufficient.

For the Korean war and a $10 billion annual military-naval program, including a 70-group air force, aluminum requirements should not exceed 100,000 tons per year. Add unknown stockpile acquisitions, and it appears that not more than another 100,000 tons would be needed. The maximum of 200,000 tons will come out of the present 700,000 tons of operating capacity, and another 100,000 tons of reconstructed capacity based on two shutdown government plants. These plants, one at Burlington, N. J., and the other at Riverbank, Calif., are to be broken up. Their capacity will be reconstructed within 12 months under a program approved by the Munitions Board. The new capacity will be located in Arkansas, Oklahoma and southeastern Ohio, where relatively expensive power will be used, and in the Northwest. About 40,000 tons of additional capacity will be placed in the Northwest, 20,000 tons at the present Kaiser plant near Spokane, and 20,000 tons at the proposed plant to be built by the Harvey Machine Co. near Hungry Horse Dam in Montana. Only interruptible power is available.

For long-run military needs, it seems that the expected capacity of 800,000 tons next year will be much less than what another World War would require. An adequate solution will depend upon more low-cost power. It remains to be seen whether the federal government will sell Congress on an expansion of hydro power for this purpose. Such a program would take about five years and would probably include the Northwest.



Rolling Mill in Kaiser Spokane plant. Kaiser will step up production by 20,000 tons

Meanwhile, the Aluminum Co. of Canada plans a tremendous development as shown by the map on the opposite page.

Most of the Northwest aluminum, about 95%, moves out of the region in the form of ingot from five plants, or sheet produced at the one rolling mill. Only a small amount is used within the region by foundries or factories. However, fabrication is expanding with Kaiser planning to increase capacity of the 250-million-pound rolling mill at Spokane by another 75 million pounds. Alcoa has completed a wire and cable mill at Vancouver to serve especially the large demands for transmission conductor. Alcoa has intended for some years to build an alumina plant at Vancouver, using imported bauxite and possible Oregon-Washington laterite. Unless the Korean war has upset the timetable, this plant may be under construction within 18 months.

As rapidly as new power capacity is completed in the Northwest, the aluminum industry stands ready to take all it can get. The Bonneville Power Administration has stated, however, that not until 1958 can any substantial expansion of aluminum occur unless a special power program is undertaken for national security.

Tailored Heat

Donald Wedge

Los Angeles Department of Water and Power

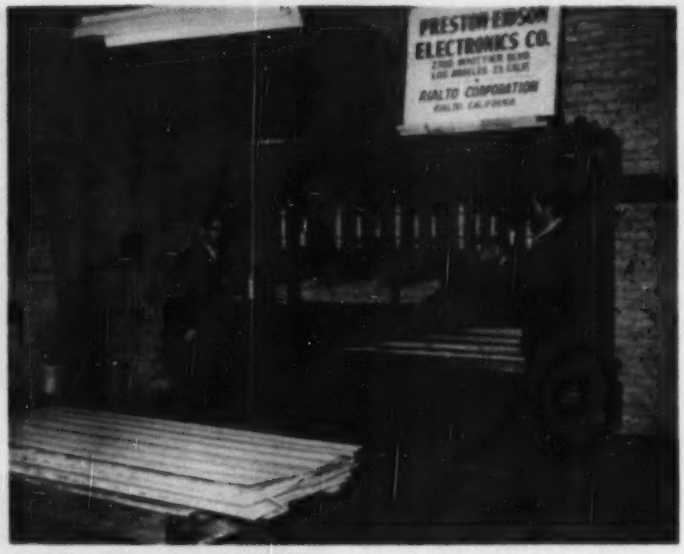
Production of slab doors has been increased from one press load every 24 hours to one press load every 15 minutes at J. W. Koehl & Son Inc. of Los Angeles. This has been made possible by a new electric heating applicatio,. developed by industrial heating engineers of the Los Angeles Department of Water & Power. Fabricated and installed by Preston-Eidson Electronics Co. of Los Angeles, a waterproof slab door with two-ply face and crossband veneer on both sides and a stronger door much less prone to warping, is being produced in an average press time of two minutes, at a cost of less than two cents for electric heat when using 1¢ per kwh. energy.

To obtain this increase in production an air drying press, used in conjunction with a cold setting casein glue which formerly required 24 hours in the press, has been equipped with electric heat. The heat is applied to waterproof thermosetting resin glue that can be set in two minutes by polymerization. Formerly, most of the moisture of the cold setting casein glue was left entrapped in the wood. The tendency for the doors to warp when dried out after removal from the press is eliminated by the new method.

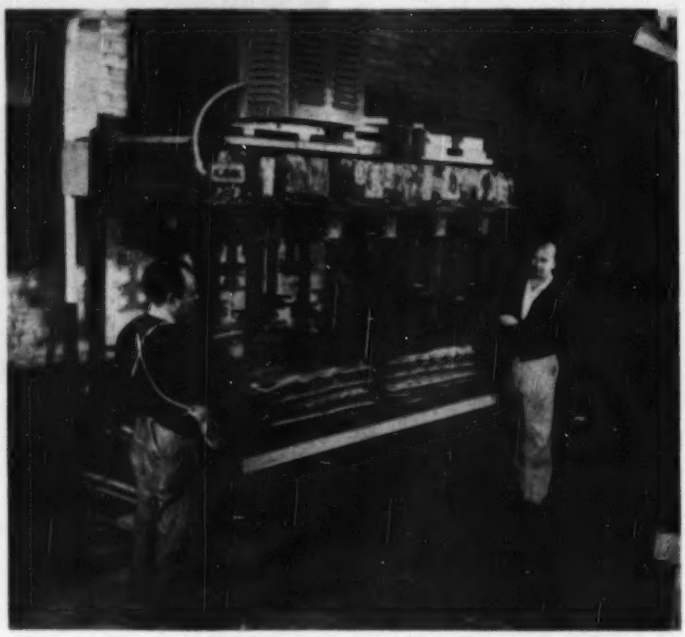
Stainless steel sheets 40 in. wide, 96 in. long, and .025 in. thick act as heating elements. These are placed in direct contact with the glued-up door panels in the press as shown in Fig. 1. Copper bus $\frac{3}{8}$ in. by 1 in. is firmly secured across each end of the stainless steel sheets. At first the buses were silver soldered to the stainless steel sheets. However, warping proved to be a problem. Later, heating elements were constructed by using machine screws placed 1 in. apart to secure the sheet to the bus. The heating sheets are connected in series by holding the buses across the ends of each sheet together with toggle clamp pliers. This is shown in Fig. 3.

Low-voltage, high-amperage, 60-cycle energy is applied directly to the sheets from a 55-kva. transformer mounted on top of the press. This maintains a watt density of approximately two watts per square inch on the element. No thermostat control is used. Heat is generated at a proper rate to be readily absorbed by the glued-up door panels that are in direct contact with the heating sheets. These heating sheets come up to a uniform heat balance of approximately 300° F., which thereby sets the resin glue by polymerization.

Doors are prepared for pressing by an automatic glue spreader applying UF101 with UF101B hardener to both sides of the crossband veneer. This is placed on top of the solid core stock, and then the face veneer is laid on top. Five minutes to 24 hours is the allowed assembly time of the adhesive. The shorter unclamp assembly time re-



1. Flexible stainless steel sheet low-voltage heating elements being placed in the press



2. Heating elements being placed in press. 55-kva. low-voltage transformer supplies heat

3. Sheet heating units are in direct contact with glued up panels when press is loaded

4. Original jack screw press used a cold setting glue. Capacity was one load per day

quires more pressure on the press to force the adhesive into the grain pores of the wood.

To load the press a door panel is placed on the cull board and a stainless steel sheet is placed directly on top of the door. Then another door and another stainless steel sheet are placed until a sandwich composed of seven doors and six stainless steel heating sheets is constructed. Top and bottom doors next to the cull boards are cured on one side only. They have to be run on the reverse side in the next press load. In this manner all the heat generated goes directly into the work. This together with the low mass of the heating sheets accounts for the high application efficiency of the heat.

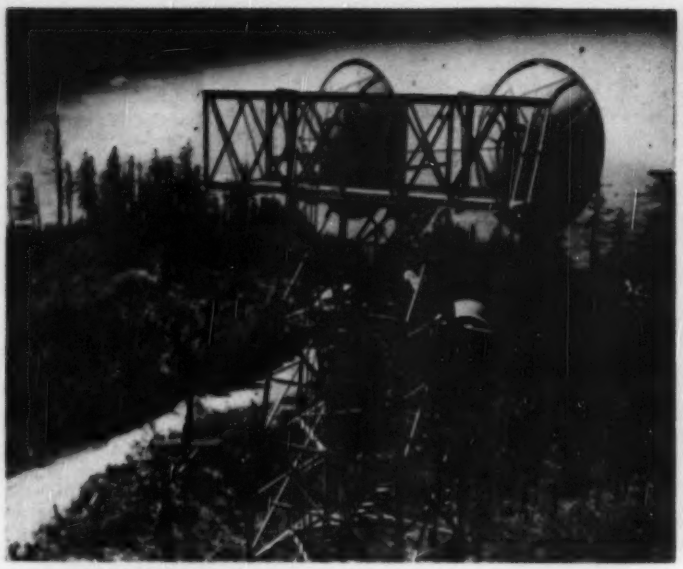
When the panel area being heated is appreciably smaller than the heating sheets, the portion of the heating sheets extending beyond the edge of the panels has a tendency to wrinkle. By applying the heating current 30 seconds before the press is closed, this condition seems to be alleviated. The exposed edges of the heating sheets will be cooled by an air blast if further wrinkling of heating sheet edges persists.

In operation the press is loaded, the ends of the stainless steel heating sheets are clamped together, the electric current is turned on and the press closed to build up a pressure of approximately 200 psi. on the work. The current is left on only a predetermined length of time, usually about 10 minutes. No thermostat control is used, as stated, the heating rate being determined by the voltage applied to the heating sheet. The amount of heat used is controlled by the length of time the current is left on. The stainless steel heating sheets distribute the heat evenly to the entire surface of each side of the door panels to obtain a full and uniform cure, and within 15 minutes the entire load of seven doors is ready to be taken from the press. The single-phase, 55-kva. transformer which reduces the voltage from 480 to 27 is mounted on top of the 300-ton press.

Operational tests indicate that press time could be reduced to less than half of the present time used (15-minute cycle), but more critical control would be required to prevent blistering, and varying moisture content of wood would present production problems. The 15-minute cycle easily meets production requirements, and results in a better cure using less critical controls.

This type of light, flexible, thin stainless steel heating sheet (.015 in. to .035 in.) can be applied economically to almost any size and shape of face or banding veneer operation on practically any type of press. The system is ideally adapted to forming curved sections such as bowfronts, waterfalls, etc., as the same flexible elements can be used for almost any shape as may be seen from Fig. 3.

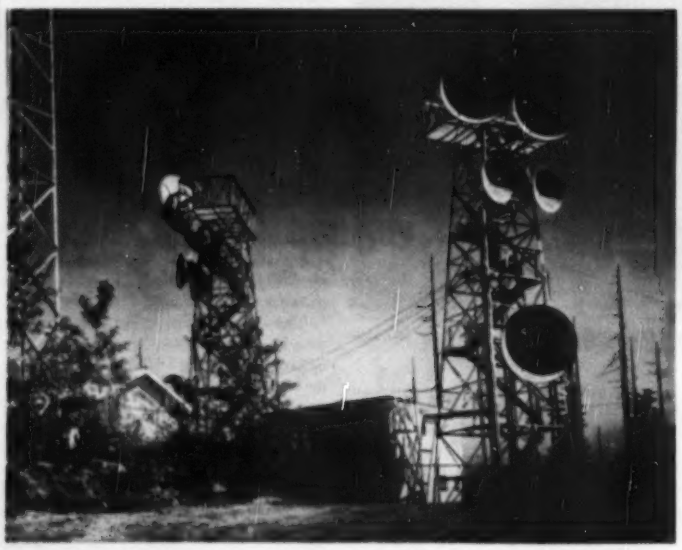
The cost of converting a cold press to a heat press when using this system is indeed nominal. No heavy platens or boilers are necessary, and very few press changes are required. Press load capacity is not reduced. Practically no space is required for the .025-in. stainless steel heating sheets, which take the place of the thick, heavy, and expensive cast iron platens normally required.



Parabolic reflectors on Squak Mt. (above and below) with Mt. Rainier in the background

BPA Completes 200-Mile Microwave Link

Richard F. Stevens



Members of the Portland Section, IRE, watched with interest the first public demonstration of the newly completed Bonneville Power Administration microwave link when they met at the BPA Substation in Vancouver, Wash., on Sept. 21. More interested, perhaps, were the BPA load dispatchers, who have long lacked really adequate communication for dispatching Bonneville and Grand Coulee power, and for operating the high-voltage grid that forms the backbone of the Northwest Power Pool. Fortunately, their situation will be still further improved next year with the construction of another link to Spokane and the intermediate power plants and stations along the Columbia River.

The link between Vancouver and Snohomish substation near Everett, Wash., a distance of slightly over 200 miles, uses Federal Telecommunications Laboratories pulse time modulated equipment, operating in the 1,700 to 1,850-mc. band. Power used is about four watts. Seven channels with frequency response between 300 and 3,000 cycles have been provided initially. Expansion to 23 channels is possible with only the addition of multiplexing units. The seven initial channels provide for four voice channels; one service channel for local checking of equipment between repeater stations; one telemetering voice channel which can be used for several telemetering channels; and one spare channel. In addition, the system provides for use of transmission line fault locating equipment.

Designed for Reliability

The accompanying map shows this first link with its relay stations, as well as the next step in BPA's microwave program. The system has been conservatively designed to provide a minimum of 100 ft. between the beam paths and the terrain beneath, including trees, at points near the center of the path. No advantage is taken of normal downward refraction, true earth curvature being used for profile studies. Duplicate transmitters and receivers are used at all points. On long hops the duplicate receiver uses a separate antenna mounted about 25 ft. below the other receiver antenna, and is operated as a diversity receiver to provide greater insurance against fading. All transmitters are provided with spares arranged to cut in automatically on failure of the transmitter normally used.

Considerable care is taken to provide dependable power sources to all stations. Remote relay stations are normally supplied from the nearest distribution circuit. This circuit drives a 3-element motor generator set, including an a-c generator which supplies the radio equipment and a d-c generator which supplies a charge to a storage

battery. In the event of failure of the incoming feeder, the d-c generator runs as a motor on the battery, maintaining a continuous power supply to the radio equipment. Each remote relay station is also equipped with a gasoline-driven motor generator set which cuts in automatically in case of an extended power outage.

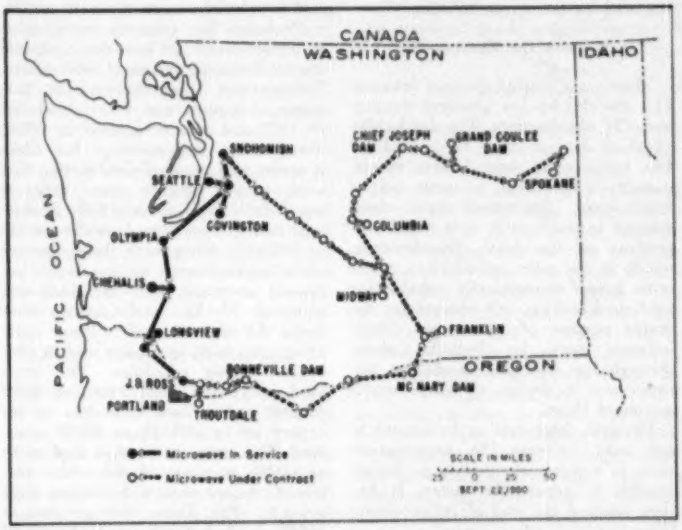
In particular, the newly developed multiplex microwave radio was carefully studied. It was found to possess many advantages for power utilities, as compared to the carrier current equipment that had been the communications workhorse in the past. Microwave stations, involving substantial first cost in site development, towers, access roads, and the like, will generally prove more costly than carrier where only one or two channels are required. If, however, these fixed costs can be shared by many channels, the picture is vastly different. Comparative estimates made for average BPA conditions, and for any number of channels from one to twelve, showed microwave to be more expensive for one or two channels, about equal in cost for three or four channels. It showed rapidly increasing savings over carrier as the number of channels increased, and for twelve channels was estimated to cost only about one third as much as carrier. Actually, nearly double this number of channels will be required over some routes within a few years, at which time the relative saving will be even more impressive.

Strong as this economic argument is, there is another argument even more compelling. Rapidly increasing channel needs for BPA and the ten major systems of the Northwest Power Pool have brought the spectrum in the area close to saturation, in spite of valiant cooperative effort by the various utilities' communication engineers to solve their interference problems.

A third reason for the use of microwave is that it can perform some functions in power line relaying and fault location which cannot be performed by any other type of channel. With the prospects of more and cheaper channels, more and more ways have been found for using these channels to better the operation of the power system. In addition to dispatching, and other voice traffic incidental to system operation, channels will be used for telemetering, supervisory control, and for the reporting of river gage and weather data from various parts of the basin. Later, facsimile and load control may be added.

Of major importance is the use of microwave power line relaying. Because of its reliability, and the fact that one need not assume that the channel may go out when the transmission line it protects is faulted, an entire new approach to the relay problem is possible. Various types of transfer trip and differential schemes, which take advantage of this factor, are being studied. Important gains can apparently be made in the speed with which many long lines can be cleared at both ends. While the problem of evaluating these benefits in dollars and cents is a complex one, it appears possible that the increase in the stable power limit of the transmission network may, in itself, be worth as much as the cost of the entire microwave system.

Perhaps the most novel use of microwave is to provide a means of instantly measuring, and recording on a chart, the distance to transmission line faults. This system was developed by Bonneville engineers and will be placed in service this fall.* Briefly, the location of the fault is measured by comparing the time of arrival, at the opposite ends of the transmission line, of the surges generated by the fault. A device capable of measuring time in microseconds is placed at one end of the line and the timing action is started by the arrival, at that end, of the surge from the fault. The other surge, which travels down the line to the far end, triggers the microwave transmitter at that point and sends a precise timing signal through space to the near end of the line, where it stops the timing device, after a time interval determined by the fault location. Equipment has been built which automatically translates this time into miles and prints it on a paper chart.



Bonneville Power Administration has embarked upon the system wide microwave communication system shown above. Future channels will link major power plants and switching centers

Performance Specified

In purchase of equipment, BPA has specified performance characteristics, but has left most details of manufacture, including the type of modulation and also the frequency, up to the manufacturer (within the limits of government bands available). The link between Vancouver and Snohomish, as stated, used Federal Telecommunications Laboratories pulse time modulated equipment, operating in the 1,700 to 1,959-mc. band. The other equipment being manufactured by Philco is pulse amplitude modulated and operates in the 7,125 to 7,425-mc. band.

Lack of money, lack of manpower, and scarcity of materials, all contributed at various times to deficiencies which had rendered the BPA communications system not only inadequate for the job at hand, but utterly incapable of meeting the needs of the expanding power facilities of the Northwest. In some ways, however, this proved a blessing in disguise. When comprehensive planning was undertaken in 1946 and 1947 for meeting future communication needs, BPA engineers were able to make the fullest use of new technical developments, without fear of rendering obsolete any extensive existing plant.

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* "A Transmission Line Fault Locator Using Fault Generated Surges," R. F. Stevens and T. W. Stringfield, AIEE Transactions, Vol. 67, part II, 1949.

OBSOLESCENCE OF WATT-HOUR METERS

Factors and costs affecting obsolescence are discussed. Meter plant should be reviewed with purpose of setting up a retirement program*

George M. Donnelly
Idaho Power Co., Boise

One of the many interesting questions confronting meter engineers today concerns the obsolescence of watt-hour meters. Determining when they have reached the end of their economic life and establishing an orderly retirement program of necessity has been somewhat curtailed during the past several years. During the early forties meters were available only in limited quantities. Supply was hardly sufficient to keep abreast of the new customers added. The first few years after the war new meters had to be used for the phenominal postwar growth of new customers and to catch up on the backlog of customers unmetered. Now that meters are again readily available the over-all picture should be reviewed with the purpose of setting up a retirement program best suited to each operating company.

It is extremely difficult to get any group of meter men to agree on the amount that can or should be expended to perpetuate any meter in its particular age group. There is perhaps plenty of justification for this disagreement. The point at which any meter can no longer be repaired economically depends on factors that are different for each operating company. Some of the contributing factors are labor costs that may vary widely with different companies; the average customer load may not be the same and consequently the per cent overload on the meter will be different, and the kwh. loss in older meters will vary: the return per kwh. is not the same for all companies, and so the loss in revenue will not be the same. The problem is to arrive at some solution of just which meter should be declared obsolete and retired. All factors reflecting on the costs of keeping the meter in service or retiring it must be evaluated.

Surely there should be no problem of convincing everyone of the desirability of disposing of old meters: meters that have been removed from service and are accumulating and being kept in storage either from some sentimental reason, or in the belief or hope that they might again someday find a useful place. The changing conditions that resulted in their removal will continue to decrease the likelihood of their ever again being used. If a minimum cost of 12% is charged for stores and inventory, it should be readily apparent that the cost of keeping such meters is prohibitive.

Reasons for Retirement

Meters are retired for two reasons: (1) the day-by-day physical damage and (2) obsolescence. The day-by-day physical damage may be caused by fire, collision by some foreign object, damage in shipment, to name only a few causes. Retirement from these sources generally will be a small proportion of the total. Obsolescence, which is the point at which a meter is no longer economically suitable for continued service, will account for the major portion of retirements. Obsolescence may be brought about through age, changing conditions, improvement in design, or some combination of these.

Physical deterioration incidental to age may increase the maintenance costs to a point where it is no longer feasible to repair the meter. It has then reached the end of its economic life.

The increasing use of electrical appliances, particularly those requiring 3-wire service, has resulted in a large replacement of 2-wire with 3-wire meters. Many of these 2-wire meters are of 5-amp. capacity and as such are unfit for further service. The increase in the average annual consumption from 540 kwh. in 1915 to 1,682 kwh. in 1949 has resulted in a large percentage of meters becoming overloaded. Because of the poor overload characteristics of some of the older types, a loss in revenue is to be expected. As average consumption continues to rise, more and more meters will be operating at a point where they are no longer accurate. Revenue loss will continue to rise.

The change from "A" base construction to socket-type installations made by many companies has resulted in an accumulation of meters with "A" type bases. Unless they are rebuilt to socket type, they become a drug on the industry. An analysis of all costs incidental to such an operation may show that it is not economical to rebuild certain types of meters.

Probably the greatest contribution to obsolescence has been the continual improvement in design of new meters. Temperature compensation for permanent magnets was first introduced in 1925 and became general by 1930. Temperature compensation for Class 2 errors was accomplished during this same period. Surge proof magnets were developed about 1940. Socket-type meters were placed on the market in 1933-34. Along with these changes were improvements in bearings, improved insulation, better terminals and terminal blocks, and many other items. All of these tend to lower operating costs both in repairs and in prolonged testing schedules. The overload range has been extended until present meters have little loss in accuracy up to as high as 400% overload. The range extends as high even as 600% in some of the newer meters. Compare that with meters built prior to 1926. These were accurate at 100% load but accuracy decreased rapidly until at 400% overload some were as much as 12% slow.

With such a rapid growth in the average kwh. consumption this error in registration can become a large contributing factor in the economic life of a meter.

Life of a Meter

In discussing any retirement plan, meters of the same type should all be assumed to be in the same age group. Unless some improvement in the design of that type has been made, the age when considering replacement costs must be the age of the newest meter. That this is proper may be shown by considering meters of the same type manufactured between 1915 and 1926. If a major overhaul is to be made on one of the older meters of this group it will be restored to as good an operating condition as one purchased in 1926. The remaining life

*Presented before recent meeting of the Northwest Electric Light & Power Assn.

would then be equal to the 1926 meter. In this manner if there was no improvement in subsequent designs the economic life of a meter could be extended indefinitely. Even though a meter has received one major overhaul, it may still receive another such overhaul, if all other factors affecting it remained the same.

If we assume a depreciation rate of 3% as applied to meters, then the useful life of a meter would be approximately 33 years. This in effect would mean that those purchased prior to 1917 would have reached the end of their useful life. In a national survey recently completed of the meters presently in service, 13% were purchased prior to 1920, 31% from 1920 to 1930, 25% from 1930 to 1940, and 31% after 1940. Unfortunately no data were available of meters purchased prior to 1915 which would include those now exceeding their useful life. Remembering that the periods do not exactly correspond to major improvements in meter design, the data did show that 44% of the meters now in service were purchased prior to 1930; that a large percentage of that number are subject to Class 1 and 2 temperature errors, do not have surge proof magnets and have poor overload capacity. It is meters in this group that in many cases are obsolete and should be retired.

Factors Affecting Obsolescence

What are some of the factors that affect obsolescence and ultimately cause retirement? When the cost of keeping a meter in service exceeds the cost of replacement with a new meter the point has been reached when it can be retired economically. Some of the costs are definite and can be accurately determined. Others are more or less based on average conditions, or average costs on groups of meters of the same type. Some companies may want to rebuild the meter, depending on what policies they have been following. Or they may want merely to replace worn or damaged parts. The cost of replacing worn or damaged parts or of rebuilding is easily determined, since the cost of the parts and the labor involved is known. This represents an initial cost of continuing the meter in service and is expendable at once and only at one time. Other costs are yearly recurrent costs, or yearly revenue lost which in the ultimate results must be treated as a yearly cost. The operation and maintenance cost of the old meter, if continued in service, is definitely higher than the costs of a new meter over the remaining life of the old meter. This cost can be attributed largely to shorter test periods, more frequent burnouts, more meter changes due to inadequacy, time spent in checking loads as insurance against overloads on the meter, and costs of more frequent record changes in the office. If the average maintenance cost per meter is known, some reasonable breakdown between the cost attributable to the old meter and that of the new meter may be reached.

If the load on the old meter exceeds its rated capacity, a loss in revenue generally can be expected. This will depend on the per cent of overload, the overload characteristics of the meter, customer demand, and energy cost in the step in the rate at which this loss in registration would occur.

Since the additional operating cost of the old over the new meter would result directly in increased revenue, this increase should also be corrected for the tax rate then in effect.

Point of Replacement

In determining the point at which supersession should occur (to compare costs under supersession with those attending actual wearing out of the old meter) the costs chargeable to the old meter in the period immediately preceding supersession must be compared to those chargeable to the new meter immediately after. The annual costs chargeable to the old meter are the cost of money, depreciation, operation, taxes and insurance. The loss in revenue, if any, due to inaccuracy of the meter may be included in operation after first being adjusted for taxes. Any rebuilding or major replacement of parts contemplated at this time should be prorated over the remaining estimated life of the old meter, and added to operation. The new meter also will have charged to it the cost of money, depreciation, operation, taxes and insurance. In addition it must include the depreciation and money cost on the old meter. Carrying depreciation through the remaining estimated life of the old meter will have the same effect as though it were worn out in service. Thus the new meter is allowed to come into service at that time carrying only its own charges. If there is any salvage in the old meter, the wearing down of this salvage during the remaining life of the old meter may be credited to the new meter.

If the difference in costs of the two meters is assumed to be negligible, then the taxes and insurance would be the same on the two. Supersession would then be desirable if the difference in operating costs was equal to or greater than the money cost and depreciation of the new meter, plus any credit from the salvage value. This can be expressed in the form of an equation where replacement is desirable, if,

$$O-O'-rC'-d'C'-(n-m)S \geq 0 \quad .1$$

where O = operation of old meter
O' operation of new meter
rC' money cost of new meter
d'C' depreciation of new meter
(n—m)S annuity from salvage of old meter

An alternate method is to allow the new meter to recover in its lifetime the original investment less the amount on hand already recovered and less any salvage value. This method distributes any saving over the life of the new meter and avoids any sharp change in savings at the end of the life of the old meter. This apparent saving consists of the real saving and the saving after the life of the old meter. It is obviously much greater than the real saving. This can also be expressed by an equation. Supersession desired if,

$$O-O'+r(R+S-C')+dn'(R+S-C') + (dn-dn')C>0 \quad .2$$

Where R is the amount of value of the old meter already recovered and the rest of the terms have the same meaning as in Equation 1.

Accounting procedure may dictate that present values must be used in determining the cost of replacement and the cost of continuing the old meter in service. The present value of keeping the meter in service will be the fixed cost of any rebuilding or replacement of parts, plus the present value of the recurrent annual costs over the remaining life of the old meter. The cost of replacement will be the money cost and depreciation of the new meter converted to its present worth.

Cost of continuing the old meter in service converted to its present worth:

$$\text{Cost of rebuild or replacement of parts} + \frac{\text{(annual recurrent costs)}\ (1+r)^n-1}{r(1+r)^n}$$

Cost of replacement converted to present worth is (depreciation of new meter + money cost of new meter)

$$\frac{(1+r)^n-1}{4(1+r)^n}$$

$$\text{Depreciation of new meter} = \frac{r}{4(1+r)^m-1} \times \text{cost of new meter.}$$

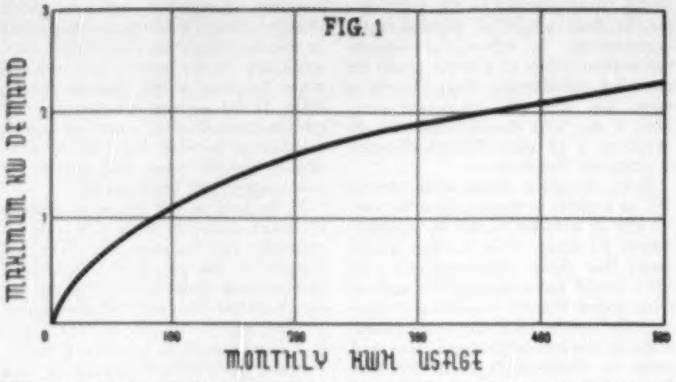
Money cost of new meter
= r × cost of new meter
r = interest rate
n = life of old meter
m = life of new meter

These values can be combined into a formula similar to that in the paper on watt-hour meter retirements prepared by W. T. Chapman and A. L.

Carvill, presented before the AEIC committee on metering and service methods. Once definite values are assigned to the recurrent costs and the life of the meters, the present values can be easily determined.

Revenue Loss

In 1940 a study was started to determine the kwh. loss on 5-amp., 2-wire meters built prior to 1926 as compared to the more recent meters. That study, in which many utilities participated, was never completed in its entirety. Many data were accumulated, however, and form the background of many studies on obsolescence today. If the relation is taken between the maximum kw. demand and monthly kwh. usage as shown in that study; the per cent kwh. used during peak periods and the inaccuracy of the meter at these loads, the following loss in revenue on such meters can be expected:



Relation between maximum kw. demand and monthly kwh. use. Fig. 1 & 2 from Electrical World

For 3c electricity:

Use	Max. Demand	Overload	% of Use During Peak	% Reg.	Yearly Loss
100 kwh.	1.1 kw.	183%	46%	98.3%	$0.28
200 kwh.	1.6 kw.	267%	54%	95.7%	1.67
300 kwh.	1.9 kw.	317%	61%	93.3%	4.41

For 2c electricity the corresponding yearly loss in revenue would be:

100 kwh.	$0.19
200 kwh.	1.11
300 kwh.	2.94

A similar analysis can be made on 15-amp., 3-wire meters. From data accumulated by one company the average kw. demand for cooking, waterheating, and lights was 6 kw. Using this demand the yearly loss on meters manufactured prior to 1926 for one cent electricity is:

Use	Demand	Overload	% of Use During Peak	% Reg.	Yearly Loss
400 kwh.	6 kw.	167%	65%	98.5%	$0.47
600 kwh.	6 kw.	167%	65%	98.5%	0.71
800 kwh.	6 kw.	167%	65%	98.5%	0.93
900 kwh.	6 kw.	167%	65%	98.5%	1.05

The following example will illustrate the point at which replacement should occur. Since there are divergent views in the methods of accounting, the example will be worked out first showing the real annual saving over the potential remaining life of the old meter, using the straight line method of depreciation, and second, converting the annual charges to the present worth of equivalent annual charges over the remaining potential life of the old meter. For the purpose of this example, the price of the old meter will be assumed to be the same as the price of the new meter. With this assumption the taxes and insurance on the old meter will be the same as the taxes and insurance on the new meter. The cost of the new meter will be assumed to be $11 and with an estimated life of 40 years. The estimated life of the old meter will be 30 years with 10 years life remaining. No salvage will be assumed.

The cost of replacement with 6% money will be:

Money cost of new meter	$0.66
Depreciation of new meter	0.27
Money cost of old meter	0.66
Depreciation of old meter	0.37
Cost of replacement, less operation	$1.96

The cost of continuing the old meter in service will be:

Money cost of old meter	$0.66
Depreciation of old meter	0.37
Total cost, less operation	$1.03

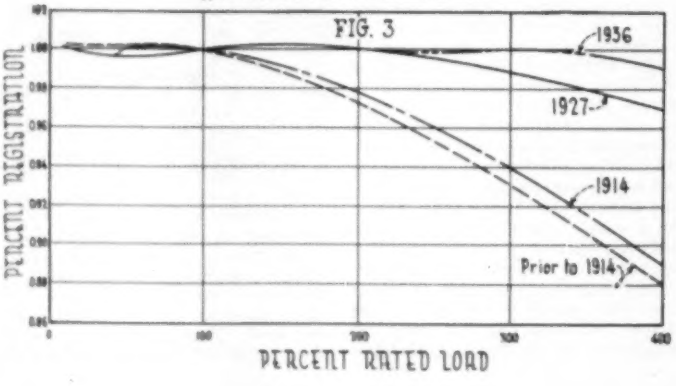
Point of Retirement

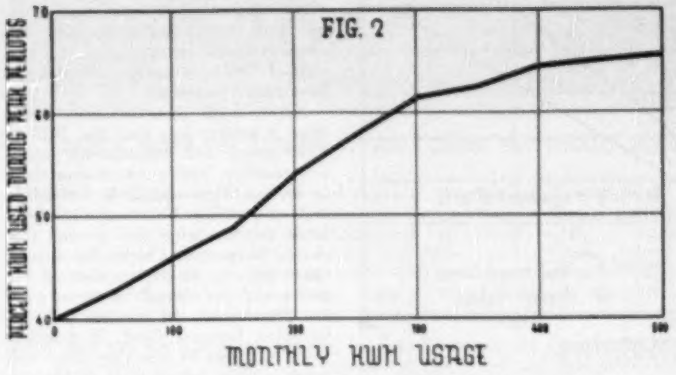
If the cost of operation, plus any revenue lost, of the two meters was the same the cost of replacement would be the difference between $1.96 and $1.03, or 93c. This is the money cost and depreciation of the new meter. When the difference in the cost of operation plus any revenue lost equals or exceeds 93c, the old meter should be retired.

To continue this example, the annual excess cost of operation of a 15-amp., 240-volt, 3-wire meter in the 1915-1926 group will be estimated at 25c. The loss in revenue will be based on an actual domestic rate schedule and takes into account the different steps at which the loss occurs.

These annual additional costs, additional cost of operation and revenue

Typical load curves for watt-hour meters





Residential kwh. used per month during peak periods in relation to monthly kwh. usage

loss, for different values of average consumption are:

Use	Revenue Loss	Excess Operation Cost	Loss Corrected for 40% Tax
400 kwh.	$0.38	$0.25	$0.38
600 kwh.	0.56	0.25	0.49
800 kwh.	0.74	0.25	0.59
900 kwh.	1.58	0.25	1.10

If the annual saving is plotted against kwh. consumption the point on the curve where the revenue loss equals 93c will be the maximum kwh. consumption at which the meter can no longer be continued in service. For the conditions assumed this consumption is 890 kwh.

Using the same constants and assumptions as above, the annual loss on a 5-amp., 2-wire meter, for different consumptions and the same rate schedule are:

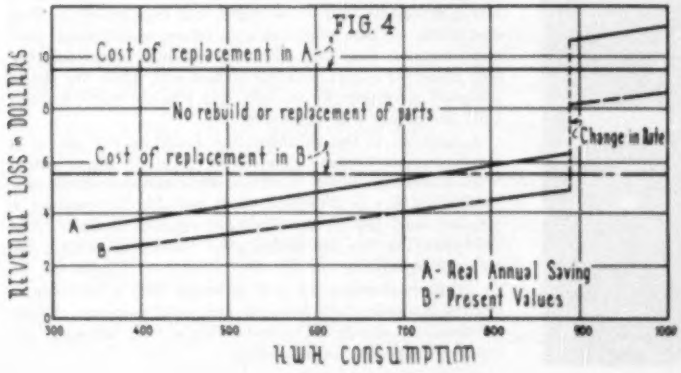
Use	Revenue Loss	Excess Operation Cost	Loss Corrected for 40% Tax
100 kwh.	$0.19	$0.25	$0.26
200 kwh.	1.11	0.25	0.82
300 kwh.	2.45	0.25	1.47

From a graph of annual saving

Table I

Cost of Meter Parts:	
Permanent magnet	$1.77
Element for 15-amp. 240-volt meter	4.79
Disk and shaft	.59
Bearing	.29
Register	1.92
Glass cover	1.18
Armour mounting parts:	
2-wire meters	1.75
3-wire meters	2.44

Economical consumption for 15-amp., 240-volt, 3-wire meter



plotted against kwh. consumption, the maximum load at which the meter should no longer be kept in service is 210 kwh.

The method whereby the present values of the equivalent annual retirement costs and the annual cost of keeping the old meter in service over its estimated life results in the following values:

For the 15-amp., 3-wire meter:
Cost of retiring the meter....$5.39
Cost of keeping the meter in service:

Use	Cost
400 kwh.	$2.80
600 kwh.	3.61
800 kwh.	4.34
900 kwh.	8.10

For the rate schedule used this again gives a maximum value of 890 kwh. This consumption is the step in the rate schedule at which the cost of electricity changed.

For the 5-amp. meter the costs are:
Cost of retiring the meter....$5.39
Cost of keeping the meter in service:

Use	Cost
100 kwh.	$1.91
200 kwh.	6.03
300 kwh.	10.81

This gives a value of 180 kwh. as the maximum consumption for which the meter could be continued in service.

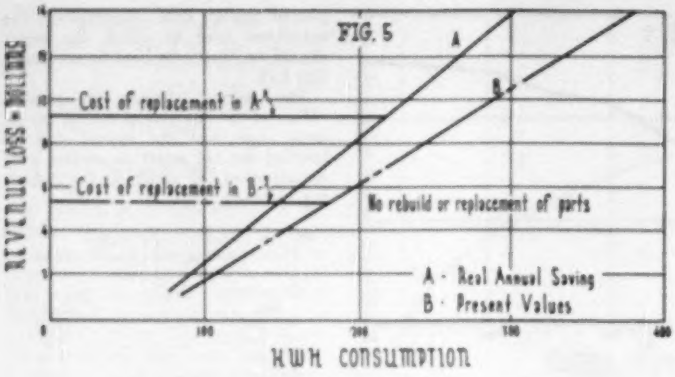
In the example nothing was spent on the meter for repairs or rebuild and the meter was assumed to complete its life without any additional expense. To examine replacement where repairs are necessary the cost of such repairs would be added directly to the costs above. As an example a $2 repair would prohibit a 15-amp., 3-wire meter being used on consumptions in excess of 500 kwh.

It costs approximately $6 to rebuild a meter. This cost, added to any of the costs arrived at above, would exceed the cost of replacing the meter, and would prohibit any such rebuild.

For ease in comparing the two methods used the annual costs in the first method are converted to costs or savings during the remaining life of the old meter. The comparisons are shown in Fig. 4 and 5.

Conclusions

The results obtained above were based on the rates and conditions of one company. For the 15-amp. meter 0.8 and 1.5c electricity was used. For the 5-amp. meter 2 and 1.5c electricity was used. These results may not be applicable to any other company. The cost of electricity may not be the same and the cost of operation may be too high or too low for other companies.



Economical consumption for 5-amp., 120 volt, 2-wire meter

However, by properly applying the correct values similar results may be obtained.

In the company cited the average yearly consumption in 1949 was 4,300 kwh. Forty-four per cent of the customers used from 360 to 900 kwh. monthly with 9% using more than 900 kwh. Meters of the 1915 to 1926 group would be unacceptable for this 9%. The average consumption of the 44% would not be far from the maximum kwh. allowable for this group of meters.

It would appear that the only way in which meters of the 1915 to 1926 group can be used is by selective use and continual rechecking to be sure the load does not exceed the maximum economical value for the meter. This adds to the operating account of the meter and must be considered in any retirement plan. Additional repairs do not seem economically justified. No rebuilds should be attempted. If a surplus of "A"-type meters accumulates, they should be retired.

Meters built prior to 1915 would show a greater loss than the 1915 to 1926 group and consequently could not possibly justify continuing them in service. They should be retired as soon as possible. No attempt has been made to determine the amount that should be spent on a meter for repairs. Once the cost of replacement of the meter and the annual recurrent costs are determined, the amount that can be spent becomes fixed. If domestic loads continue to rise they may well reach a point where some of the meters manufactured after 1926 may have to be replaced due to economical obsolescence. At the present time there does not seem to be any justification for selective use or retirement. The only problem is to determine the amount that can be spent to continue the meter in service.

In this discussion no mention has been made of 3-phase meters. It is generally felt that the conditions affecting them are not as serious as with the single-phase meters. The same analysis, however, would be used.

TELETYPING KILOWATTS

Jess Paschall
Portland General Electric Co.

Quick and dependable communication heads the list of most essential things needed by load dispatchers. With the complexities of operating the Northwest Power Pool and the great distances involved, communication becomes the life blood of the whole operation. When the Intercompany Pool was started Sept. 1, 1947, comprising five major utilities, operations headquarters were established in Spokane. Operation is under Marshall Blair, Washington Water Power Co., and representatives from the other companies.

The writer represents his company—the Portland General Electric Co.—and communications became his first problem. Contact with his system operator in Portland, 385 miles away, had to be quick and dependable so that operations of that company's facilities would meet pool requirements. The long-distance telephone provided the only means of communication at first and, while the phone company gave priority to calls, this was not quick enough and, moreover, was expensive.

A solution to the problem was found in the use of a Teletypewriter working on a leased circuit 24 hours a day. With a machine in the Spokane office and one in the dispatcher's office in Portland, it is possible to transmit a message and get an answer back almost instantly. The Teletypewriter has the added good feature of putting the message in writing for the file, if need be. There can be no misunderstanding. A bell indicates that a message is coming through; three bells, an emergency message. Emergencies are answered immediately; other messages are typed on tape for later reading.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Delayed action

Just as it took time to organize and stage a comeback in Korea it has taken time to pass and now to set up the bureaucracy to begin controls. But the old laws of supply and demand have been working regardless, drawing off copper, zinc, tin, lead and steel; upping prices, bringing demands for more wages from labor and causing general inflation. But the building business has been rushing—to try to get things built before the clamps go on. And then of course there's the election—

Us too

Now that the ice has been broken in San Francisco bay area, IBEW locals in Seattle and Tacoma are asking an up in wages and paid vacation too. While the agreement runs to Dec. 31, negotiations have been started by Puget Sound Chapter, NECA and Local 76, a month in advance of opening date for negotiations.

NECA agenda

Nothing much has yet been announced as to the program for the big National Electrical Contractors Assn. convention at the Biltmore, Los Angeles, Oct. 16-20, except that Dr. William B. Stratford, dean, Weber College, Ogden, will be a principal speaker on "The Crisis Facing the Free Enterprise System." But a number of important constitutional changes are to be voted on, among them: That budget items of over $10,000 must be okayed by the annual meeting; liberalizing qualifications for election to president and vice-president; limiting terms of these offices to two consecutive terms; calling for reports from all standing committees to the administrative committee and board of governors; making the president a member of all committees, the executive vice-president an advisory member; giving only members who pay more than $100 a year dues a full vote, others only half a vote; requiring temporary membership in local chapters for traveling contractors; several proposed changes in the dues, such as: including Alaska in dues; paying dues for work outside of continental U. S., with a $100 maximum; reduce national dues to 2/10 of 1% from 3/10 at present; raise the $25 minimum to $50 and set a maximum of $1,000; another reducing dues to 2/10 of 1% of labor pay roll but having neither minimum nor maximum dues. Might be a lively discussion.

Lower the boom

A general contractor, his superintendent and a crane operator are up for manslaughter because when the crane touched an 11-kv. line a man touching the crane was killed. Charges were preferred by the California Division of Industrial Safety under a new law prohibiting placing equipment within 6 ft. of high-voltage wires. In the past four years 89 have been killed because of such accidents and now prosecution is being made in each case.

No guide in this

Peculiar twist was given the Taft-Hartley Act when U. S. Circuit Court of Appeals in D.C. reversed the NLRB by deciding it was not secondary boycott when Denver IBEW and plumbers struck a general contractor because he had an electrical contractor who employed some non-union electricians. Yet this case was directly opposite from one in New York where the court upheld NLRB where IBEW picketed an electrical contractor in Port Chester. So when is a secondary boycott?

Challenge

Old timer Modesto contractor, motor man and engineer Frank Andrews is suing the California engineers registration board to grant him an engineers license on the basis of his long experience. The board turned down his application and would require him to take an examination.

Stir alarm

An Alertronic burglar alarm, which fills the entire space with sound waves, too high pitched to be audible, but when anyone or thing moves in the room modulates the frequency and operates the alarm, is one of several remarkable devices announced by Photobell Co., 116 Nassau St., New York. Also publishes a book, "Electric Eye Circuits and Relays in Theory and Practice."

It's a date

Date for the next annual meeting of the New Mexico Chapter of IAEI has been set for Jan. 11-13, 1951, at Hilton Hotel, Albuquerque.

Allis-Chalmers Mfg. Co. health and safety department has prepared a manual on safety, called "Advanced Apprentice Production Electricians Safety Manual" covering injuries, shocks, burns, cautions before starting a job, various safety practices around switchboards, instruments, transformers, etc. Should help anyone in training apprentices. — **Safe ways**

Dick Buckby, (Richard A.) long time Westinghouse Lamp Division representative in southern California, plans to establish a manufacturers representation business in the Hawaiian islands, with lighting equipment and accessories. — **Islands**

Frank Airey and Harry Barnard joined long distance in congratulating and honoring D. H. Murphy, founder and president of Wiremold Co. on the occasion of his 50th year when all employees presented him with a television set and many commendations for fine employee relations. — **Recognize pioneer**

Sixteen Chicago area fluorescent lighting manufacturing companies and Local 134, IBEW now have a single instead of separate agreements and it is based on a job evaluation study by an industrial relations counselor. The agreement is between the Chicago Lighting Equipment Mfg. Assn., of which M. C. Wilt, president of Curtis Lighting, Inc. is president, and the Mike Boyle union. The agreement includes All-Brite, Curtis, Electro, Electronic Sales, Good, Grayco, Harvstone, House-O-Lite, Leader, Lumalite, Lighting Products, Mitchell, Modern, Solar and Universal Fluorescent. — **Sixteen in one**

Nu-View House Number is a new fixture combining a porch light and illuminated house number. A molded Bakelite case holds two 15-watt lamps, with removable plastic translucent numbers on the front and a luminous panel underneath. Can be attached to any ceiling fixture or replace it. Made by Brittain Products Co., Akron. — **Two services**

Four booklets full of usable data on lighting are available from Benjamin Electric Mfg. Co., Des Plaines, Ill. They are: "Planning Guide to Improved Plant Lighting," a 32 pager with management viewpoint; "Strip-Line Data Bulletin," with data on uses with Sky-Glo ceilings, etc.; "Sky-Glo for Prestige and Profit," stressing modernization possibilities; and "Magna-Flo" Bulletin, giving full information on the entire range of these new units for slimline lamps. — **Selling helps**

Electrical contractor Montgomery Electric Co. of Portland and Seattle is advertising the scope of his services with a handsome new brochure picturing many of the company installations in power plants, lines, schools, industrials, lighting, residential and even home appliances. — **Tells to sell**

A gasoline and oil resistant, non-leaded wire, designed especially for circuits to gas pumps and for control and other circuits in oil refineries, has finally been developed. General Electric announced it at the inspector conventions. Called Geotrol, the Flamenol insulation has an additional protective sheath that is defiant to gasoline. — **Prayer answer**

Spang-Challant just opened a new electric metalic tubing plant at Etna, Pa., completing the Central line of electrical raceways offered the trade and also distributed in the West. — **More**

Pass & Seymour are getting quite a bounce from their two cartoon electricians. Contractors and electricians have been sending in gag lines to go with them, so now there's a contest for the best captions, with a $25 prize for those used. — **Gags pay**

Gene Garcia is mighty proud of the vast new General Electric Supply Co. building, opened Sept. 21 at 53rd and Hollis, Emeryville, replacing an outgrown place in Oakland, and taking on in addition the major appliance and radio and television service for northern California, formerly located in San Francisco. Has parking space for 80 cars, lots of other features to be described later. — **Major move**

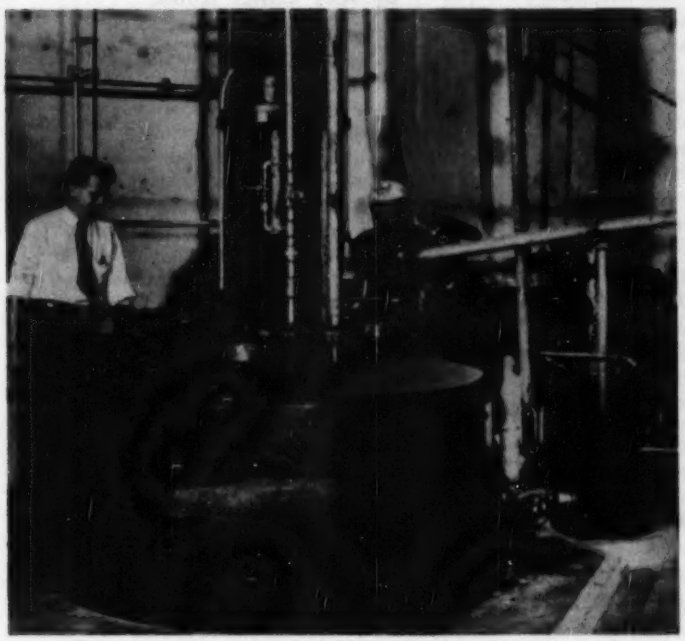
Lovable Joe Siddall didn't make the rounds of the Inspectors conventions this year, where he was a perennial favorite. A heart attack, July 14, took him from the industry forever. He had just retired from H. H. Robertson Co. as manager of its commercial engineering department. — **Missed**

A bathroom mirror that won't fog is now offered by Charles Parker Co., Meriden, Conn., which puts a sheet of U. S. Rubber conductive rubber back of the glass to keep it warm. Is mounted in a wall-type cabinet with built-in fluorescent lights and controlled by a switch. — **No drip**

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 72

SUBJECT:	Electric Synthetic Resin Kettle
CUSTOMER:	Bennett's, Salt Lake City, Utah
TYPE OF BUSINESS:	Paint and Glass
SERVICE COMPANY:	Utah Power & Light Co.
DATA SHEET PREPARED BY:	Allen B. Rudy



Electrically heated synthetic resin kettle is heated by six calrod units rated 25 kw. each

A "Dow Therm" jacketed-type kettle is used by Bennett's of Salt Lake City to make synthetic resins used in paint manufacturing and in varnishes. "Dow Therm" is the trade name of the Dow Chemical Co. for a high boiling point, heat transfer medium used to transfer heat from some source to the resin in the kettle. The kettle is known as a Synthetic Resin Kettle, and is rated at 750-gal. capacity. Temperatures required from 450°F. to 600°F., depending upon the type of resin being made. Temperature must be held within very close limits. This is done electrically.

The Synthetic Resin Kettle is supplied with heat by means of six 220-volt, immersion-type calrod heating units rated at 25 kw. each. The heating units are immersed in the "Dow Therm," which is in a jacket surrounding the kettle. Total connected load is 150 kw. The kettle is supplied with a high and low heat range. When the kettle is being heated to the required temperature, the high heat will be turned on. As the resins approach the desired temperature, an electric control automatically changes the heating units from high to low heat. This change always takes place when the temperature of the resin is several degrees below the desired temperature to prevent the resin temperatures from over shooting the desired temperature level.

Although this is the only method ever used by Bennett's in the production of resins and varnishes, there are methods other than electrical available. One such method is to fire the "Dow Therm" boiler with oil or gas. This requires a separate boiler house and an elaborate system of well-insulated pipes, and pumps must be used to convey the "Dow Therm" from the source of heat, or boiler, to the kettle where the resins are heated. This type of installation requires more building space and more equipment, for the same kettle arrangement, than the electric installation.

Advantages of Electric Installation

Electrical heating is more economical to install since the cost of pumps, piping, and an extra building for a boiler is eliminated. Heating electrically lowers costs by eliminating a man to watch the boiler and keep it operating. The cost of keeping everything operating correctly without interrupting production is lower. Maintenance costs are held to the minimum. There are no pipe joints and pumps to be checked for leaks and operating performance. Electricity is clean and free from odors that may be annoying to operating personnel. It permits close control of temperatures automatically; it is the most convenient source of energy that can be used.

Operating Data

Full capacity of the plant is 2,400 gal. of synthetic resins in a 24-hour day. Actually production is dependent upon the type of resin desired, since different types of resin require different intervals of time, varying from three to ten hours. A kettle batch consisting of 500 gal. of solids will produce 1,200 gal. of finished goods.

Electric service is taken through a single meter. Because of this no electrical data on the operation of the Synthetic Resin Kettle are available. Energy consumed by the kettle falls in an end rate block and is great enough to cause an over-all reduction in the cost per kilowatt-hour for the plant as a whole.

ELECTRICAL WEST

For the Record

ESPECIALLY significant is a statement made by President T. E. Roach of Idaho Power Company relative to the recently completed Bliss hydro station. "It is particularly gratifying to be able to report that the final cost of this project was substantially below our original estimate," he said. "This accomplishment is directly attributable to a combination of skillful engineering, efficient supervision by our own construction organization, excellent performance by the contractor and close adherence to shipping schedules by the equipment manufacturers."

Contrast this accomplishment with performance on government projects. According to the Hoover Commission report, federal projects usually cost 25% to 100% more than original estimates, even with many of the same contributing factors that President Roach commends. Somehow the critics of free enterprise and the profit incentive can never explain contrasts such as this.

A Parade with No Bands?

A DYNAMIC business can never stop advertising or promoting or selling. Two recent events show how true this is for the electrical industry. Northern California has an Electrical Wonderland Exposition scheduled for late September. At the height of the scare buying which followed the Korean flareup there were those timid souls who said, "Call the whole thing off." Appliance stocks were melting away as the public rushed to buy. "We won't have anything to show, to say nothing of sell," these folks insisted. Now with floors covered with appliances, radios and television sets and with the public showing marked resistance to recent price increases, they are happy that the show is to be held. In fact every exhibit space is sold.

Imposition of Regulation "W" points up the same moral. Even if quotas should be cut back as much as 25%, the wise and seasoned appliance distributors and dealers know that some real advertising and selling will be required to move merchandise. To keep its place near the head of the parade the electrical industry cannot afford to stop advertising or selling for a single minute.

By Any Other Name

MANY a municipal utility which resented being called socialistic, whose founding advocates were idealists aiming only to give the ownership of the city's electric system "to the people," and who gave as the major reason for going into business that thus the management would be kept local and more responsive than absentee ownership in so-called "Wall Street," are today in the same kind of a bind that utilities owned more tangibly by private citizens have fought against for years. The federal government more and more is moving in on them. The autonomy they prize so highly is being maneuvered away from them.

Ideologically linked with "public power" and having given great aid to its establishment, the socialism they refused to recognize as such is threatening to engulf them as well as the "wicked" private business enterprises. That is the way socialism works. A country is never half slave and half free, as Lincoln contended. Who will say that socialism brings freedom to do anything but as one is told by the political bureau?

Advantage has been taken of the war emergency again more firmly to get a grip on the power industry, both municipally and privately operated. In the last war in mutual patriotic effort the two groups worked harmoniously together in a voluntary way. Such is not to be the pattern in this emergency for the administration in Washington has taken unto itself and its Secretary of Interior the rulership of the power resources of the nation. Although denying dramatically that he is a Communist or fellow-traveler, from his public addresses in the West there can be no doubt of his wanting socialistic control of all the electrical industry. The zealous municipals will find themselves also included. Their autonomy is to be regulated and restricted too.

As someone has said about socialization, there is no such thing as being a little bit pregnant.

EDITORIAL VIEWS

Recipes for Lighting

CASH registers will start jingling soon for everyone in the electrical industry that has an interest in home lighting. Basis for this optimistic assertion is the new set of light-conditioning recipes developed at Nela Park. In the same manner that application of the simple recipes assures the homemaker of an efficient, adequate and modern lighting installation, so too will their application assure the industry of a profitable return. For a five-room, 1,000-square-foot house recipes step up the fixture installation from the present meager $10 allowance to a $150 figure. Floor, table and pin-up lamps require an equal investment. The $4 average figure for lamp bulbs goes up to $32 because of the additional light sources and the mixing of incandescent and fluorescent lighting. Finally the 3,200-watt installation will lift the annual consumption from an average of 630 to approximately 2,000 kwh.

Detailed study of the home lighting recipes which are described elsewhere in this issue should convince anyone in the industry that here is a lighting program that will benefit manufacturers, distributors, contractors, dealers, the power companies and finally, the general public.

Circuit Protection is the Issue

FROM the two annual conventions of the electrical inspectors it is plain that these guardians of public safety have no objection to the No. 12 branch circuit for a minimum. What they are concerned about is the inadequacy of present circuit opening devices, both fuses and circuit breakers. Without quicker acting clearance of a circuit that is short circuited, and still enough time delay to let a loaded motor get started, there is still an element of safety in the 15-amp., No. 14 circuit —not much, but a little, if the fuse is not upped to 30 amp.

There was also great distaste shown for added confusion over the Type-S and Type-X non-tamperable fuse as suggested by EEI. To introduce one more kind of fuse and receptacle for it, they felt, would only make matters worse.

You Can Say That Again

WE BELIEVE in the "many in one" campaign idea . . . This year, Community Chests are uniting more than 15,000 health and welfare agencies in one big effort to raise approximately $190,000,000. Being businessmen we see the advantage of uniting these many campaigns under one efficient, fund-raising activity. Industry know*s that production costs drop as volume increases. Over 30 years' Chest experience* prove*s that coordinated campaigns cost less, save time and energy and raise more money to provide more and better services. Big or small, federated campaigns guarantee effective use of the funds subscribed. They substitute order for the chaos that comes with separate fund-raising efforts. Proof that the "many in one" campaign is effective lies in the fact that appeals are being federated in more and more local communities. Leaders of both management and labor, in civic clubs and governmental departments, from professional circles and educational groups are giving increasing endorsement to the idea of joint campaigning and budgeting. The number of communities organizing Chests has steadily increased. In 1940 there were 561 reported Chests. By 1948 the number had grown to 1,060. At the present time definite information is available about Chests in more than 1,250 cities. Federated drives raise more money for the participating agencies than they raise separately. No city has ever reported that it raised* less *money for its needed services in a federated campaign than the agencies secured independently in separate appeals . . . United campaigns are wisely planned, cooperative undertakings. We believe they make sense and should be supported generously by all thoughtful businessmen.*—Charles E. Wilson, national campaign chairman (president, General Electric Co.) and Charles E. Wilson, vice-chairman, Community Chests of America (president, General Motors Corp.).

Wise Smith Grant Klawa Stayner Alderman Gaffney Rising Kirsop Garff Gawne Volheys

Inspectors and the 20-amp.

Two different approaches were made to the "hot potato" subject—20-amp. circuits and non-tamperable fuse protection—at the two annual meetings of the Northwestern and Southwestern Sections, International Association of Electrical Inspectors, in Seattle, Sept. 11-13, and San Jose, Sept. 18-20, respectively.

The Northwestern Section made a frontal assault on the EEI proposal to change the National Electrical Code and voted it down, 4 to 3.

The Southwestern Section nimbly ducked the 20-amp. circuit issue completely but attacked the crux of the problem—circuit opening characteristics of both breakers and fuses. If it gets the faster acting circuit protection it asks for the 20-amp. circuit would be no problem.

Aside from this controversial but vital subject, changes wanted in the code by inspectors were few although discussion was lively, even in the high ambient range at times. Several of the speakers addressed both meetings, the details of which follow:

Northwestern Section

The Northwestern Section, IAEI, deliberated code revision proposals of the correlating committee (Report of July 1950), offered some recommendations of its own, heard technical papers and reports, elected new officers and enjoyed the usual social events at its 24th annual meeting in Seattle, Sept. 11-13, 1950. L. B. Garff, inspector of Tacoma, first vice-president, conducted the meeting in the absence of D. J. Wolters of Salt Lake City, president, who was unable to be present. Glenn W. Charles of the Seattle inspection department acted as general chairman of the meeting with a substantial array of Seattle electrical industry people assisting on the details.

Smith Wise Garff Kirsop Gaffney

In the code deliberations, extending panel by panel over the three days, the meeting voiced opposition to proposed revisions in two major respects. Debate on the proposal to change 15-amp. to 20-amp. capacity in branch circuits was widespread among members and brought out a rather substantial agreement that if this change is made it points up the need for outlet or socket protection. In the final vote to get the concensus of the meeting the opposition to the change won in the ratio of about 4 to 3, on the ground that increasing the capacity and fusing branch circuits to 20 amp. would tend to increase the hazard in the use of lamps and portable appliances.

In the changes proposed for Article 240, substituting the designation "tamper resistant type fuse" for the "type S plug fuse" the meeting reiterated its stand taken in previous years, resisting this change. The meeting went on record again as approving the Type S fuse and making it mandatory.

A few other exceptions were taken to the report of the correlating committee but not in any significant respect, and no major revisions were recommended in the section's own panel committee reports.

The meeting got off to a good start through welcoming addresses by Dave Levine, Seattle councilman, and Arthur B. Langlie, governor of the State of Washington. Governor Langlie cautioned against the infiltration of socialistic and communistic ideas into the politics of the nation and pled for eternal vigilance on the part of the citizenry, looking toward the retention of our fundamental American concept of the dignity of the individual, belief in God, and return to the spiritual values that have made this country great.

In his presidential address, J. E. Wise, international president, electrical engineer of the Wisconsin Industrial Commission, Madison, discussed internal affairs of the association and outlined some of its principal objectives. As to code making he urged that

Southwestern Section code discussion panel: Trim, Maxwell, Smith, Muller, Ufer, McNabb, Veit, Dobson, Brandon, Thornton and Watson

"we keep open minds to accept and develop new methods and new devices; that in promoting uniform administrative ordinances, we should act in an advisory capacity only; that we should keep records of fires and accidents to guide us in future preventive measures; that we remember we are servants of the public and keep the public interest always in mind." D. J. Wolters, Salt Lake City, Northwestern Section president, sent a message of greeting and cheer, urging the meeting to work diligently toward continually improving the NEC.

Reports by W. L. Gaffney of Tacoma, secretary-treasurer, and the several chapter officers, indicated a healthy activity throughout the year, and a sound financial position at the year's end. Chapter officers reporting were: H. W. Rising, Boise, for Idaho; A. E. Fleming, Salt Lake City, for Utah; Roy E. Crosby, Spokane, for eastern Washington; Walter S. Lindsey, Havre, for Montana; C. S. Alger, Seattle, for Puget Sound; and Paul L. Miller, Portland, for Oregon. A substantial increase in membership during the year was attributed in large part to the formation of the Oregon Chapter with O. T. Fugitt, chairman.

Industrial Control Assemblies

Discussing the subject of electrical inspection of industrial control installations, J. J. Mellon, Allen Bradley Co., Milwaukee, Wis., pointed to the number of special equipments needed in modern industrial controls and the impracticability of having all these specials "tested and listed by Underwriters' Laboratories." These special equipments, he assured, have been perfected in accordance with standards of the AIEE, American Standards Association, and NEMA, which have been developed over a period of many years of joint consideration. Reputable manufacturers cannot afford unsafe designs, for customer acceptance is paramount for continuing successful business enterprise, he said.

H. H. Watson, General Electric Co., Bridgeport, and chairman of Panel No. 2, explained the procedure used in his panel for adopting or rejecting proposed code revisions. All suggestions made to the panel are reported upon, he said, either approved, rejected or held over for further consideration.

Low-voltage, automatic temperature control circuits, were discussed by C. W. Nessell, Minneapolis Honeywell Regulator Co., representing the Gas Appliance Manufacturers association explaining the safety features of these control circuits. "We wish to eliminate the conflict between the code and present safe wiring practices," he said. "The code should be interpreted in a realistic manner and modified, if necessary."

A plea for better inspection of rural wiring was entered by Thomas P. Branch of the Rural Electrification Administration, Washington. The REA has instituted a program of education of its cooperative members in the use of power and in the construction, operation and maintenance of their own electric systems. This program has enabled most cooperatives to develop a more acceptable and positive electrical inspection program for its members.

Donald T. Brophy, Rohm & Haas Co., explained the use of plexiglass for signs and fixtures. C. L. Smith, IAEI secretary, besides conducting the discussions of the correlating committee's recommendation for code revision, reported on the educational activities of the Safe Electrical Cord Committee, showing and describing the pamphlets and promotional material available for distribution to users of electric service.

Buried Cables

Samuel J. Rosch, Anaconda Wire & Cable Co., told of developments in wire and cable insulation, and stated that many of the products going into insulation now are under allocation. He cautioned about micro organisms in soil, stating that these bacteria attack certain insulation material. Cable ought to be buried 24 inches, since there are no bacteria at that depth.

The first code breakfast, under the chairmanship of John C. Hewitt, chief inspector of State of Washington, Olympia, raised the question of the marking of cable. It was brought out that cable suitable for direct burial or other uses should be labeled not only on the reel but on the cable braid itself, so that field inspectors, who seldom get to see the reel, would know whether the proper type of cable was being used for the particular job in question. The second code breakfast with Cliff Atkins, electrical inspector, state of Oregon, in the chair, discussed heating elements used in panel heating. Inspectors raised the question of how they were to know whether the heating cable had been properly installed in accordance with the Underwriters' Laboratories report. A cable manufacturer suggested a committee of the Northwestern Section be organized to study all panel heating, and write a specification to cover inspection of such installations.

Officers elected at the final business meeting were: L. B. Garff, Tacoma, president; first vice-president, Chris Klawa, Portland; second vice-president, Harold Rising, Boise; secretary-treasurer, W. L. Gaffney, Tacoma; executive committee: John Hewitt, O. A. Alderman, J. D. Gawne, T. M. Widrig, Seattle; J. Hyde Stayner, Salt Lake City; John Crawford, Butte. R. J. Larrabee, Seattle, was elected the executive council to serve with holdover members, W. L. Gaffney and C. M. Kirsop, city electrician, Olympia, and second vice-president of IAEI.

An invitation from the Spokane Chamber of Commerce to hold the 1951 meeting in that city was accepted. Extra curricular affairs included the annual golf tournament, boat ride and luncheon for the ladies, and the annual banquet, at which A. L. Pollard, Puget Sound Power & Light Co., was toastmaster.

Southwestern Section

Maxwell Hansen Carey Ufer Johansen Muller

Because there were no changes to Articles 210 and 220 proposed from the members of the Southwestern Section the proposed changes from EEI never reached the code discussion stage although they were referred to obliquely when H. H. Watson, General Electric Co., Bridgeport, chairman of Panel 2, gave a brief resume of how a code panel works. However, prominent place was given to circuit protection in a series of recommendations for changes to Article 240. This covered not only a demand for faster operating overcurrent protective devices to prevent excessive burning and arcing at the point of a fault by clearing the circuit instantaneously, but also demand that circuit breakers must not be interchangeable with those of higher ratings, and that switches either be able to carry their rated current or be marked plainly as to their maximum.

And as for the proposed new tamper-resistant Type-X fuse the section voted a loud and unanimous disapproval of adding to the confusion by adding another kind of fuse and fuseholder.

On the interrupting of current in case of shorts the committee had even proposed specifications for time delay devices in dwelling occupancies. The committee asked that 15- and 20-amp. overcurrent protective devices be of the time delay type and "shall clear the circuit instantaneously at any current over 100 amp. Ranges, heating devices and other appliances whose load is essentially non-inductive shall be protected by overcurrent devices which shall clear the circuit instantaneously at any current more than 100 amp. One-sixtieth of a second or less shall be considered instantaneous." After discussion this was referred to a special committee which reported back asking the appointment of a technical subcommittee to study and recommend improvement of existing standards for these devices.

After all the other code change proposals made by the section members had been discussed and acted upon a single motion approved the remainder of the NFPA Correlating Committee report on recommended code changes, thus blanketing in the 20-amp. circuit proposals and the increase to 3 watts per sq. ft. minimum.

Another code change requested repeatedly for the past three conventions, one to require a safety control switch located in or on all signs and outside lighting to disconnect both conductors and thus provide safe working conditions for electricians servicing signs, was again voted vehemently. Also voted were recommendations for protection of crane contact conductors against accidental contact, similar to those in the California State Safety Orders. Article 670, long a bone of contention, was asked to be deleted from the code unless wood-working and other multi-motored equipment are included with the machine tool requirements.

Much time was spent over proposals by John Thomas Carey, Honolulu inspector, relating to the effect of tropical climate on electric metallic tubing. It was pointed out that the jurisdiction allowed an inspector to decide what is suitable under local conditions should cover most of his requests for specific code changes.

R. B. Maxwell, president of the Southwestern Section and San Jose chief inspector, urged, in his presidential address, better public relations for the inspector. "A great many inspectors think that they must get tough" he said. "They only succeed in making things miserable for everyone, including themselves." He advocated the use of good judgment, striving for uniform interpretation and enforcement as a basis for better public relations and safer installations. He ended by admonishing, "Be pleasant, be courteous, be firm. Treat everyone equally."

Other speakers who gave much the same addresses as those reported in the foregoing Northwestern Section meeting, included IAEI President Wise, Secretary-Treasurer Charles L. Smith, J. J. Mellon, H. H. Watson, C. W. Nessell and S. J. Rosch. The latter, speaking before a luncheon audience of members and wives, gave his more popular version dealing with modern chemical developments and their relation to modern living. He touched on a few of the points respecting cables for underground use only briefly. J. T. Silveira, manager, Pacific Fire Rating Bureau, Los Angeles, added some notes of caution after reviewing how fire insurance rating is done. He ended with these thoughts, "I hope your organization will stick to fundamentals. You have a sound basic code formulated by a representative cross-section of those interested and affected. Your National Electric Code serves this basic purpose admirably. With a nationally respected laboratory service at your elbow, you are standing on firm ground. You have the confidence of the fire insurance industry. Digressions could prove costly." He had previously shown that fire losses attributed to electrical causes for the U.S. ran 1½ million dollars a month.

In the annual report on electrical fires and accidents, H. V. Dobson, Santa Barbara, again noted the preponderance of fires due not to the wiring system but to careless use of electricity and to refrigerator motors overheating. This indicated a need to have all such motors equipped with built-in thermal cutouts. E. E. Carleton, electrical engineer, Department of Industrial Safety, summarized the annual accident report which showed a decrease in fatalities although an increase in accidents and the probability of electrical accidents being fatal as greater than in other types of accident. Cords, tools and cranes still account for the largest share.

In his report on finances, H. G. Ufer, section secretary-treasurer, announced that the new city memberships have been taken by 81 cities and counties and the assistance thus given has brought the section into black ink. The chapters all reported progress during the year. Reports were heard from L. B. Sterling, Fresno, for the Central California Chapter; C. E. Jarvis, the Sacramento Valley Chapter; F. L. Preizner, Arizona Chapter; M. K. Bliss, the Northern California Chapter; E. V. Muller, Southern California Chapter, and E. Warren Small, Hawaii Chapter. Ufer announced the recent formation of a Nevada chapter, but the demise of the Imperial Valley Chapter.

At the two code breakfasts, over which Delbert Hansen, Oakland, and Ben H. Wheater, Long Beach, presided, topics covered: hospital operating rooms and explosions; whether automobile showrooms should be classed as hazardous locations; heat

Harter, association president, center, awards door prize to a contractor at San Jose meeting

from higher wattage lamps in smaller bulbs and its effect on sockets and wire in ceiling fixtures; explosive rubber dust in tire recapping plants; whether the separated box attached to a ceiling inset lighting unit can be used as a pullbox or not. A new type of wire that is oil and gasoline resistant was also shown.

At the election of officers Ed V. Muller, safety engineer, California Department of Industrial Safety, was made president; R. D. Johansen, city electrical inspector, Alameda, first vice-president; C. R. Meikel, city inspector, Bakersfield, second vice-chairman; and H. G. Ufer, secretary-treasurer. Executive committee member elected was retiring president R. B. Maxwell, chief inspector, San Jose. Members still having tenure are Cliff McClelland, Jesse Ross and H. K. Winterer. To represent the section on the IAEI executive council Delbert Hansen, Oakland chief inspector. H. G. Ufer was re-elected A. C. Veit, Los Angeles county inspector and next year's IAEI president, and B. F. Weisinger, San Francisco, remain on the council.

Responsible for the smooth running convention were a number of hard working local committeemen, headed by Maxwell. They attended to the multiplicity of details, played hosts graciously and made the affair a success. They included R. V. Lotz, E. H. Snedaker, Wm. Wheeler, Del Bennett, George Harter, Tony Goulardt, Ed Stock, Al Rothholtz, Mike Radisich, J. Santora and R. B. Maxwell Jr. Santa Clara County assisted San Jose substantially in making the entire convention hospitable. Both the Electrical Contractors Assn. of Santa Clara and San Benito Counties and IBEW Local 332 joined in serving the 195 registered a barbecue dinner at Alum Rock Park, and providing entertainment.

Anaconda's Sam Rosch tells how "magoozalum becomes a plastic by aid of a catalytic agent

LAUNCH AW FORUM AT SAN JOSE

More than two hundred people from the electrical contracting industry and wholesalers, inspectors and manufacturers associated with them, met in San Jose Aug. 23 for an "Adequate Wiring Forum." Following a steak dinner, the group heard eight talks covering the need for increased promotion of adequate wiring, what AW means to the contractor and wholesaler, and some of the ways in which improved wiring standards can be obtained.

George Harter, president of the Electrical Contractors Assn. of Santa Clara and San Benito Counties, opened the meeting, discussed the basic reasons for getting together in such a joint effort. He introduced D. S. Aiken, division sales manager of PG and E., who spoke on "What Is Adequate Wiring?" R. B. Maxwell, president of the Southwest Section of the IAEI and chief electrical inspector for San Jose, spoke of the inspectors' approach to adequate wiring and the safety angle which must be considered.

Matt Sherwood, field representative for NECA, spoke on "How Long Will You Be in Business?" covering the responsibility of the electrical contractor in promoting better wiring. Lee Haywood, district manager of Anaconda Wire & Cable Co., asked "Are You Prepared to Power Up?" with a presentation of the industrial modernization program which has been sponsored nationally by that company. He emphasized the need to include better electrification of industry in any program to promote adequate wiring. Robert Haggerty of Millard & Haggerty, San Jose, spoke on the place of radiant heating in the promotion of adequate wiring. Primarily, he emphasized, the industry must attempt to combat the idea that radiant heating is necessarily gas heating.

The wholesaler has a responsibility in the program, said Howard Guilbert of Service Electric Co. His first job, however, is to sell the members of his own organization on the adequate wiring program so that it can be carried on in contacts with the contractors. Walter Abraham of the Northern California Electrical Bureau spoke on "Adequate Wiring in Action," describing the Blossom Hill Manor Tract promotion shown in September ELECTRICAL WEST. "What Adequate Wiring Means To Me" was described from the contractors' point of view by Vic. Pfeffer of Pfeffer Electric, San Jose.

The Adequate Wiring Forum was the forerunner of several expected to be held in northern California during the fall months. This one was sponsored jointly by the Electrical Contractors Assn. of Santa Clara and San Benito counties, the San Jose Division of PG and E, the Western regional office of NECA, the Northern California Electrical Bureau, and Local 332 of the IBEW.

Raver Wickard

Hurd Northrop

Cleaveland Ambrose

Customer Service Theme of Public Power Meet

Bonneville Power Administration asked to be named marketing agency for Northwest. Lessons from storm damage are discussed

Ways and means of improving customer service predominated in papers and discussions of the Northwest Public Power Assn., meeting at Portland, Sept. 13-15, in semiannual convention. Discussions ranged from steps to be taken as a result of lessons learned during last winter's severe storms to the public relations value of a good home economics program. The Public Power meeting had been preceded by a two-day meeting of Region 9, National Rural Electric Cooperative Assn. Concern was expressed by REA Administrator Claude R. Wickard over criticism of labor. All borrowers are being told that they must respect the right of labor and of their employees to organize and bargain collectively. REA is going to ask that contract work and force account work be paid the prevailing wage in the region as determined by the Department of Labor, he said. Committee hearings are to be held on the administration of policy on generation and transmission, but Wickard said that Congress had asked for no basic changes in policy as set forth in the REA act.

The Northwest is not in a position to make the contribution to defense that it was in 1942, said Dr. Paul Raver, BPA administrator. In 1942 there was a potential of two million kilowatts from Bonneville and Grand Coulee plants. Now, he said, power requirements continue to exceed generating capacity and we are falling further behind. This condition is expected to prevail until 1957 under normal conditions. Power demands of the defense program will intensify and prolong this shortage unless we reappraise the federal program and take vigorous measures to speed up generating schedules, Dr. Raver said.

Among resolutions passed by the REA group were: one asking the Secretary of the Interior to name BPA as the power marketing agency for southern Idaho; another expressing confidence in the patriotism of Chapman, Straus and Raver who had been under attack; one expressing lack of confidence in Edward Falk and asking that he be removed from the National Security Resources Board; and another asking Congress not to give ground in permitting REA to proceed with generation and transmission, and cooperation with federal agencies necessary for the economical development of the REA program. Spokane was selected as site for the 1951 meeting.

Public Power Meeting

Efforts to obtain an adequate power supply for the Northwest were cited by D. L. Marlett, BPA, as the major problem of the region's electrical industry as a whole. Bonneville since 1950 has agreed to supply in excess of 120,000 kw. additional interruptible power for expansion of defense industries. Commitments, said Marlett, include 40,000 kw. to Kaiser Aluminum and Chemical Corp., Spokane, for a seventh potline; 10,000 kw. for Reynolds Metal Co., Troutdale; 10,400 kw. for Pacific Northwest Alloys, Spokane; 21,000 kw. for Victor Chemical Co., Silver Bow, Mont., and 37,000 for Harvey Machine Co., Kalispell, Mont. It will be possible to serve only plants capable of using interruptible power during the next three years, he said, unless national defense authorities request service to essential defense industries, at the risk of cutailing loads in their region.

Steps being taken to avoid recurrence of major pool outages like that of June 6 last were outlined by S. E. Schultz, chief engineer, BPA. These included a new relaying set-up at Coulee; dropping of the 600,000-kw. aluminum load at 57 cycles, and utility loads when frequency drops to 56 cycles; new telemetering to the BPA dispatching center at Ross substation so that the dispatcher will know what is happening at key points on the major grid; and supervisory control from Ross of major system oil circuit breakers. Circuits out of Coulee are now carrying 200,000 kw. per circuit, compared with a design limit of 180,000 kw. By next year loadings will reach 250,000 kw. per circuit and some interruptions must be expected, said Schultz.

Storm Lessons

A panel on lessons learned from the 1950 storm disaster was presided over by V. M. Cleaveland. From experience of the Clark County PUD, F. H. Lehman drew the following conclusions: do not stub corner poles, angle poles, or transformer poles, and keep these key poles in a perfect state of

Miller Payette

McGuire Schultz

Ellis George

repair; the ratio of height to length on down guys should never exceed 2 to 1; pay close attention to sagging of conductors during construction; use compression-type splicing sleeves whenever possible (a number of automatic splicing sleeves failed under severe tests and their use should be confined to hot-line work); service drops should not exceed 120 ft.; all danger trees should be removed and all overhanging limbs trimmed.

Others on the panel stressed the following points: Every utility needs two-way mobile radio and *two* transmitters. Radio can pay for itself in a few weeks. Keep plenty of spare automotive parts. Buy heavy-duty equipment. Utilities should have several pieces of four-wheel drive equipment; safety training pays off in case of storms.

Other Panels

Valuable information and pointers were given by a panel of five on preventive maintenance with Sedric Payette as discussion leader. Subjects covered were circuit breakers, automotive equipment, pole testing, stubbing and replacements, transformer inspection and testing; tree trimming and right-of-way maintenance, and the REA maintenance program. A trouble dispatching panel under L. K. Ambrose brought out methods used on an REA, a municipal and a PUD system. In a panel on radio communication, Chairman R. A. Benson said that the average cost per mobile radio unit per month has been found to be $20. This covers maintenance, depreciation and fixed charges. On reclosers for rural lines Vincent Slatt said that manufacturers have failed to standardize on time-current characteristic of automatic reclosers and that as a result as much as 75% of their range can be lost by mixing them on a line. Carl Miller, Lewis County PUD, said that the cost of relocating facilities on account of highway relocation had become an unreasonably burdensome problem to utilities, particularly the smaller utilities, and that an attempt should be made to secure legislation or changes in the policy of state highway departments so that utilities would not be saddled with all the expense.

Customer Service

A home economist and a home service department can be a tremendous aid to a utility in developing better relations with its customers, Mary Klock, home economist for Seattle City Light, told the group. She outlined an organizational set-up for a home service department and went into the selection of personnel. Economics, not sentiment, governs the farmer's use of electricity, declared Clarence Hurd. To secure the maximum load and the most satisfactory year-around usage, a utility should go aggressively after the farm business with a specific program that leads, and not follows, the times, he said.

We need a review of the whole procedure of billing to eliminate some of the complexities, said Milt Bona, who heads an advertising agency in Vancouver. Public relations is the accumulation of a lot of little things, he said. The public doesn't blame you for the big things—it is the little things that humanize the utility business, said Bona.

Things the Electric Power Board of Chattanooga, Tenn., is doing to better customer relations and build load were told by C. B. Osborne and S. R. Finley of that board. The good job being done seems to be attracting national attention. Resolutions passed recommended: that the entire authorized power development program of the Corps of Engineers and the Bureau of Reclamation be expedited with utmost diligence; that the Secretary of the Interior be urged to designate the Bonneville Power Administration as the marketing agency for all federally generated power north of the California, Nevada and Utah border and west of the Wyoming border, and that the states of Washington, Oregon, Idaho and western Montana be considered the marketing area of BPA; that the Pacific Northwest congressional delegation be urged to support the concept of a single federal marketing agency in the Pacific Northwest region as above defined; that bills which would set up a basin account for Clark Fork-Kootenay and Snake rivers, be opposed.

After heated discussion a recommendation of the rate committee that house heating not be served until such time as the defense emergency clears up and there is an adequate power supply, was tabled. Those representing municipal utilities felt strongly that during the present power emergency, house heating should be deferred in favor of industry and other uses; those representing PUDs took the position that they could not dictate to the public what they could and could not have.

Award of the Milton Hunt McGuire Award for engineering accomplishment was made to Sol E. Schultz, chief engineer, Bonneville Power Administration.

Yakima or Wenatchee were favored for the spring meeting of the association and Missoula was selected as site of the 1951 summer meeting. F. Ford Northrop was retained as president of the association.

AMA

Phoenix appliance dealers, distributors, manufacturers' representatives and the utilities have formed a new association, Appliance Merchandisers Assn., patterned after the San Diego Bureau of Home Appliances. The new sales promotion association held its first meeting late in August to elect officers. Central Arizona Light & Power Co. announces that its "Appliance Dealer News" will be changed to a dealer-distributor sales report, called the American Merchandisers Association Bulletin. All utility appliance ads will carry the AMA signature.

PANORAMA OF THE PCEA

The first part of this year's three-part Fall Conference will open on Nov. 2, when the Operating Economics Section meets in San Francisco. A week later, on November 9, the Business Development Section will gather in Fresno. The final session will be held in Los Angeles on Nov. 16, 17, when the Administrative Services Section holds a joint PCEA-Pacific Coast Gas meeting.

The three-part Fall Conference being inaugurated this year is expected to overcome the difficulty that has been encountered in finding a suitable meeting place convenient for all delegates in the face of the growing attendance at the former all-sections conferences. The plan is to rotate the three sections among the three cities mentioned so that delegates will find it convenient to attend the sections of their choice at regular intervals.

The Operating Economics Section will meet at the Whitcomb Hotel, San Francisco, Nov. 2, with A. A. Straub, Southern California Edison Co., acting as general chairman and Alf Hansen, General Electric Co., vice-chairman. A breakfast at 8 a.m. in the hotel's Crystal Room will open the session; E. C. Hunt, PG and E, will preside during the after-breakfast discussion.

The group will gather again for a luncheon at noon, with PCEA President F. A. Tracy, president, Sierra Pacific Power Co., presiding, and Albert Gage, president of the California Electric Power Co., as principal speaker.

During the morning and afternoon these groups will meet in parallel sessions:

Communications, P. H. Adams, San Diego Gas & Electric Co., sponsor; engineering design, F. S. Benson, PG and E, sponsor; hydro generation, James N. Keith, California Electric Power Co., sponsor; meter, C. C. Blecksmith, Duncan Electric Mfg. Co., sponser; safety, E. C. Hunt, PG and E, sponsor; steam generation, J. A. Longley, Allis-Chalmers Mfg. Co., sponsor; substation, Robert Milmoe, Bechtel Corp., sponsor; transmission and distribution, overhead division, D. R. Ritchie, Pacific Electric Mfg. Co., sponsor; and transmission and distribution, underground division, H. S. Christensen, Southern California Edison Co., sponsor.

At its Aug. 4 meeting in San Francisco, the guidance committee of the Business Development Section of

A Job to Do

A. X. Schilling

PCEA unanimously approved a "Task Force Plan" method of operation. Its objective is to achieve continuous committee activity throughout the year by resolving problems which now confront the electrical industry under changed international conditions. The most effective industry-wide methods will be developed to attack and solve the problems.

Under the system, each committee will prepare a "Work Plan" for the entire year. This plan will include:

First, a brief statement delineating the scope of interest and responsibilities of each committee;

Second, a statement of specific problems, now confronting the section of the industry covered by each committee;

Third, a statement of realistic objectives to be accomplished during the year;

Fourth, an outline of the tools and methods to accomplish the objectives.

Also discussed at the guidance committee meeting was the Business Development Conference to be held in Fresno, Nov. 9. A get-together breakfast will open the agenda. Parallel sessions for individual committees will be conducted until luncheon, at which there will be a talk pertinent to business development by Dr. David E. Faville, Stanford University. Parallel sessions will be resumed until 3:30 p.m. The delegates then will consolidate into three groups: the agricultural committees, the commercial-industrial committees, and the residential committees.

It is the aim of the guidance committee to make this a working conference rather than a convention type of meeting. During this "shirt-sleeve" working conference practical plans will be formulated to solve the difficulties confronting the individual Business Development Section activities. The conference sessions will further the projects in the "Work Plan."

The Business Development Section includes 16 committees participating in the following basic activities as follows: agricultural electrification, adequate wiring, commercial-industrial lighting, electrical living, liquefied petroleum gas, advertising and industrial power.

The guidance committee for the section includes R. I. Mendes, PG and E, chairman, Business Development Section; H. C. Rice, Southern California Edison Co., vice-chairman, Business Development Section; J. H. Adams, Southern California Edison Co., chairman, adequate wiring committee; W. F. Chapman, San Diego Gas & Electric Co., member-at-large; H. T. Atwater, Leo J. Meyberg Co., member-at-large; J. A. Corlett, General Electric Co., member-at-large; E. A. Cornish, National Electrical Contractors Assn., member-at-large; F. M. Falge, General Electric Co. Lamp Department, chairman, C-I lighting committee; E. R. Gray, California Electric Power Co., member-at-large; Wilkes Lambirth, California Electric Power Co., chairman, LP-Gas committee; F. M. Raymond, San Diego Gas & Electric Co., member-at-large; C. V. Roseberry, Westinghouse Electric Corp., chairman, agricultural electrification committee; J. S. C. Ross, PG and E, member-at-large; S. W. Scott, Graybar Electric Co., chairman, electrical living committee; W. H. Thompson, Westinghouse Electric Corp., vice-chairman, electrical living committee; J. A. Warren Jr., Nash-Kelvinator Sales Corp., member-at-large; and L. Wollenberger, Coast Counties Gas & Electric Co., member-at-large.

The joint PCEA-Pacific Coast Gas Assn. meeting participated in by the Administrative Services Section this year will be held on Nov. 16 and 17, with headquarters in the Clark Hotel, Los Angeles.

E. J. Wright, San Diego Gas & Electric Co., is section chairman, and Dexter Stoner, Coast Counties Gas & Electric Co., is section vice-chairman. The section will devote its attention to problems concerning these groups: general accounting, John L. Liecty, Central Arizona Light & Power Co., sponsor; customer accounting, Forrest U. Naylor, PG and E, sponsor; personnel, John A. DeGroot, Westinghouse Electric Corp., sponsor; purchasing and stores, S. R. Robinson, San Diego Gas & Electric Co., sponsor; rates-valuation-statistical, E. J. Lage, PG and E, sponsor; transportation, W. K. Stevenson, Southern California Gas Co., sponsor; right of way and land, H. L. Moore, Southern California Edison Co., sponsor.

Chamberlain Redfield Holloway Packard Dawson

"Will Still Need Selling in 1951"

San Diego Bureau's condensed conference advises dealers on future trends

Experimenting for the first time with a program starting at dinner and continuing through four packed hours of talks and conferences, the Bureau of Home Appliances of San Diego County put on a meeting for more than 500 dealers and distributors, Sept. 8. The program included guest speakers not only from many parts of the West Coast but also from the East.

In the featured speech of the evening, D. A. Packard, general sales manager of the Kelvinator Division of Nash-Kelvinator Corp., Detroit, told the group that "the major appliance industry would still be capable of a high rate of production in 1951, even after currently estimated military needs are met." He said that present steel supplies available for civilian production next year will be probably one-third greater than the amount used in 1941, but that critical shortages could develop in other materials used in making appliances—nickel, tin, aluminum, lead and polystyrene.

But whether the next few months bring easy or difficult selling conditions, Packard said, appliance dealers should take a good look at the quality of the service to their customers. "Your future business is more dependent on the attitude of your customers to the products that you have sold them than it is on anything else you will ever do of an advertising and sales promotional nature."

Service Points

He suggested six points in the dealer-customer relationship where good service would mean the difference between customer satisfaction and disappointment: (1) Honest product presentation during the sale, avoiding overselling; (2) proper delivery and installation of product; (3) house call by salesman after delivery; (4) proper telephone handling of service calls; (5) promptness in response to calls; (6) quality of service rendered.

The newly elected president of the newly named Bureau of Home Appliances, R. T. Redfield, presided at the opening of the conference. He introduced A. E. (Doc) Holloway, president of the San Diego Gas & Electric Co., who reported on the electric and gas progress since the last conference. Holloway said that his company had made 6,700 new connections during the first nine months of 1950, an increase of 1,290 over the same period of 1949.

Setting the pace for the talks to follow was Harry E. Callaway, past president of the bureau and presently vice-president of the National Association of Music Merchants. Speaking on "The Retailers' Foster Father," Callaway said that the type of service that the bureau performed during World War II will be needed again in the present emergency. He said that dealers could expect an "all-out economic war" whether or not the present conflict spreads. There will be an increase in shortages, he said, and in running their own businesses dealers will need more cash for inventories and higher taxes.

Production Outlook

In a symposium wherein six manufacturers' representatives gave short views on the "Production Outlook," the guests received last-minute observations on the appliance business. Opening the talks, John Ryan, Sunbeam, said that electrical housewares manufacturers should be able to maintain normal deliveries for the balance of 1950, because they are always working 90 days ahead. The vacuum cleaner future, said Jack A. Keim, P. A. Geier Co., depends on the continued supply of aluminum and plastics. Be-

fore the Korean War, he said, vacuum cleaner sales were running 14% ahead of the same period of 1949.

John Engstrom of G-E kitchen appliances startled the group by reporting that the first dishwasher patent had been issued 101 years ago. He said that the progress of dishwasher sales had been increasing steadily during 1950 before the Korean situation caused a boom that gave one manufacturer a backlog of 30,000 units on the first of August. The public has been buying ahead of its needs, reported Bill O'Keefe of O'Keefe & Merritt, and a drop may be seen this fall. He saw no price changes in the gas range picture during the balance of the year, but could not tell what might happen early in 1951. Production should remain about the same during the four fall months as it was during the same months of 1949, he said.

The outlook for television was presented by E. S. Germain, Stromberg-Carlson, who said that the present shortage was due to many factors, including high consumer demand, stockpiling that has caused shortages of components, plus the use of components for the largest volume of radio sets made since the end of the war. He expected increases in prices right down the line. Placing of another tax on television will not have a material effect on set sales, he believed.

The continued need for dealer and distributor advertising even during periods of shortages was emphasized by Fred Fenton, Easy Washing Machine Corp., who pointed out that most manufacturers were continuing their heavy schedules of national advertising. He pointed to one of the problems that the appliance dealers and distributors on the West Coast must face—the longer time needed for carloads to reach the coast because of rerouting to lines not heavily loaded with war materials.

Sales Training Program

The plans and progress of the bureau's sales training program was outlined by the director of sales training, Dan Turner. He emphasized that the advent of credit controls and partial shortages will increase the need for adequately trained personnel in the dealers' stores. Dealers will need to sell merchandise instead of terms, will still have to sell specialty goods. Following Turner's talk, the advertising and promotion plans of the bureau were reviewed by "Frosty" Raymond, the advertising adviser, who used a series of slides to present past and present promotional programs.

In a major address, Anderson Borthwick, president of the First National Bank of San Diego, covered the economic picture facing the dealers and the industry. "Panic buying appears to be subsiding," he said, "but there will remain for at least several months a market for practically all the civilian goods which industry can turn out." In such a market condition, Borthwick saw (1) That consumer credit controls and rising price levels will be strong influences in contracting the size of the market; (2) that rising employment, greater pay rolls and the psychology of a wartime economy will be factors partially offsetting the effect of credit controls and adjustments in prices; (3) tightening manpower situations will result in a lower level of employee output, unless management displays remarkable leadership; (4) there will be higher taxes in the months ahead, and changes in the ways of paying taxes."

Gordon Dawson was chairman of the program committee, assisted by Taylor Brown, R. T. Redfield, E. W. Meise, Ed Reed, J. F. Zweiner and the bureau's secretary-manager, J. Clark Chamberlain.

Philo Farnsworth Pioneers Again

A new TV tube that accumulates each complete scanning and then discharges it all at once, 30 times a second, was announced for the first time by Philo Farnsworth at San Francisco Electric Club, Sept. 18. The inventor of the first electronic scanning for television (in San Francisco 24 years ago), Farnsworth said the new "memory" tube would eliminate scan lines that now cause eyestrain, increase brilliance 5,000 times, sufficient for theater projection, eliminate distortion on a viewing screen, provide more clarity for color pictures, yet not obsolete present TV sets. While it is Farnsworth's invention and developed by the Capehart-Farnsworth laboratories, of which Philo Farnsworth is vice-president and director of research, the memory tube will be made available under license to all picture tube manufacturers. It may yet take two years for full production, however. When that comes it should reduce set cost, as a less powerful circuit is needed. Farnsworth was guest speaker in conjunction with the opening of the microwave relay between Los Angeles and San Francisco by Pacific Telephone & Telegraph Co. He recalled his difficulties 20 years ago in getting even a half-mile line over which to send first TV images.

Home Econ Institutes

Seattle to have them too

Seattle too will have a course of Electrical Living teachers institutes. Plans are being made to condense the courses that were given so successfully in San Francisco and Los Angeles, under sponsorship of the Pacific Coast Electrical Assn., in the Seattle area under the sponsorship of the Seattle Public Schools Home Economics Education department, of which Edna Martin is in charge. Miss Martin is also national chairman of the Home Economists association.

The program was initiated through the efforts of Howard Oliphant, General Electric Co., who had aided in the California courses. Recently he was made appliance manager for the company in the Northwest and told interested home economists in the region about the values to be obtained from such courses. Miss Martin became interested and it is through her efforts that the program will be set up and accredited as part of the home economic courses at University of Washington.

Instead of a long course it was decided to condense it to six weeks. To teach the course the same group of manufacturer home economists that worked so well together in California will be enlisted. These include Marjorie Harper of General Electric Co., Lois Ferris of Westinghouse Electric Corp. and Marguerite Rinehart of Hotpoint. Edith Rausch, Puget Sound Power & Light home economics director and chairman of the Electrical Women's Round Table of Seattle, will also assist. Probably others not yet named will also be called upon to inform the students of home economics and those who teach it in the public schools on the use and operation of modern electric home appliances.

Interest has also been aroused in Oregon, where later next year it is probable that a course may be put on at Salem under the supervision of the state supervisor of home economics education.

SMUD Schedules Cooking School

On Oct. 4 Sacramento Municipal Utility District started a series of cooking schools for the public, under the direction of its home economists, Miss Anne Terk and Miss Carolyn Larson. Classes will be given each Wednesday from 2 to 4 p.m. and will continue through the Christmas holiday season. All demonstrations are admission free.

ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

October 1950

Hangover

Now that both Korea and pre-Reg. W buying splurges are over and have skimmed the cream off the top, it is settling down to hard old selling again against higher down payments and less income after deductions. And though merchandise is in fair to middlin' supply, buyers aren't. These be belt and cost-of-doing-business tightening times but not to let down on selling effort, ingenuity or imagination.

Upward pass

Price increases by just about everybody can be expected as wage rates are upped, materials reflect the increased labor cost of providing them, and taxes added. It is another round of inflation, or to say it bluntly, devaluing of the dollar. Only good reaction may be a change of "I can get it for you wholesale"discount boys to "I can get it for you—at a price."

Biggest show

San Francisco Electrical Wonderland Exposition was just about the biggest thing seen in those parts, considered a huge success by all. Official nose count was 114,784 and more than 95,000 paid admissions. Filled main and both wings of the Civic Auditorium with TV, radio, appliances, wiring systems, electric heating, electric tools, lighting-both domestic and commercial, and even broadcasting. The Edison exhibit of original inventions, supplied by Ward Harris and sponsored by S. F. Electrical Contractors Assn. and local Union No. 6, IBEW, was a unique cooperation by contractors and union in shows of this kind. Pictures and details in next issue.

Hunger

What the attendance and interest showed was a tremendous acceptance of things electrical by the public. All the exhibits got a big play. There were times when the crowds were so big that seeing the merchandise was difficult.

Side shows

Electro lost his master's voice. The Westinghouse mechanical man was operated from voice signals by a trained MC. Before the show ended the young man was called into the armed services. Despite all that could be done by a substitute, using the same script, Electro wouldn't budge. His wave lengths did not match. . . Only gas leak was one lone range that slipped in by mistake but was unnoticed. Where there's gas there's a leak. On the other hand one more gas range maker went electric. Tappan showed a shiny new electric range with many unique features, among them corner oven elements. The electric exercisor gal in the flesh and a pair of Sylvania lumens provided electrifying S.A. to an otherwise mechanical and electrical galaxy.

Northern invasion

A deal to bring natural gas from Texas to the Pacific Northwest through Colorado, Utah, Idaho into Washington and Oregon is being made by what is called Trans-Northwest Gas Co., headquartered in Spokane. Original

plans were to bring gas in from Alberta but that deal seems to have bogged down. It will bring vigorous competition for home cooking and heating uses to electric utilities and appliances. Already heater people are advertising equipment that burns coal or oil but can be converted to gas.

Color TV

Color TV is now snafu, but def. FCC ordered manufacturers to redesign their sets for the CBS system but left the door open for more signs of progress on other systems. Manufacturers almost all have said they can't redesign for at least six months. Other color systems are rushing their research to get in under the deadline. Nobody is happy but CBS, which has a deal with Remington Rand to make commercial color equipment called Vericolor for use in medical, commercial and educational transmission.

Watch that promise

A San Diego municipal court ordered a dealer to repay full purchase price and installation costs to a man because he had been told he could receive Los Angeles telecasts, but all he could get was the San Diego station. He had even had another dealer make the installation. The dealer had to take back the set and return his money and the added cost of installation.

Names

People you know — Ward M. Doland, district sales manager for Deepfreeze in Seattle, has been called back into the infantry as Captain. . . Art Clark has taken a new job and Mitchell Daigh, lamp specialist, takes his place at Salt Lake's G-E Supply. . . Roy Munroe, who sold the first electric iron in Denver, now head of Public Service Co. of Colo. Dealers and Builders Dept., celebrated his 50th year with the company.

Colossal

Bill Quinn, manager of Los Angeles Electric League and members of Show Management were up to case the S. F. show and arrange to bring to the All Electrical Exposition at Pan Pacific Auditorium, Los Angeles, Oct. 20-29, some of the top exhibits, among them the Edison inventions. Edgar Bergen and Charlie McCarthy will be feature attractions twice daily, there will be TV casts and featured demonstrations, Westinghouse atomic exhibit and other such to bring in the crowds.

Dosey doe

Most surprisingly successful promotion, one that just clicked, has been the Crosley Family Square Dance which took square-dance-crazy Salt Lake City by storm. Eight dealers and Western Supply Co., Crosley distributor, took the prescription of Ralph Stoddard, enlisted KSL-TV, Frank Urry actor, Roy Koerber, champion caller and a western band, and went to town. The program, to be described in detail next issue, went into the dealers stores with a tie-in.

Better than ever

Plans for San Diego's 13th annual Electrical and Home Appliance Show Nov. 24 indicate an attendance surpassing the record 165,000 who attended last year, O. G. Thompson, chairman, reports. Bureau of Home Appliances put on the show.

Will handle

Graybar in San Francisco, Los Angeles, Salt Lake City and Phoenix, will handle distribution in those areas for Sylvania radio and TV products.

Glareless

"Lightcaster" is a new ranch-style residential and commercial lighting fixture of Lightolier's. Shallow enamelled dome reflects light from a light-well suspended below it; gives glareless spotlighting. Comes in two sizes, 25-in. wide with 9-in. lens, or 17-in. wide with 6-in. lens.

Named

Motor Supply Ltd., Honolulu, is newly appointed distributor of Whirlpool washer, dryers and ironers in the Hawaiian Islands.

A local promotional scheme on vacuum cleaners that may well turn into a big national campaign is the work of Lewyt's southern California distributor, Suss, Young & Brown. Conceived by SYB, the "Life with Lewyt" program is being tested first in the Los Angeles area. Full-page color ad on the 1951 cleaner broke in Life magazine early in October, plus heavy local newspapers advertising and 300 dealer window displays. An unusual twist—SYB, Lewyt and Life all cooperated to offer a merchandising package for Lewyt dealers to give the Oct. 2 issue of Life free to any person seeing a demonstration of the cleaner; those purchasing a Lewyt to get a year's subscription to Life. If the promotion clicks, Lewyt will make it a national affair.

Push on cleaners

Dasher-mixed ice cream from your own refrigerator with the new electric Pioneer ice cream freezer, claims the manufacturer, Louisville Electric Mfg. Co. The freezer fits any standard refer, is placed in the bottom of the freezer compartment. Underwriters' approved.

Dash your own

Something new in sewing machines—Sewmatic portable electric machine made by Erie Products Co. Moving parts are enclosed in an aluminum housing with only sewing head and flywheel exposed. Total weight is 11½ lb; has no bobbin; tension control is automatic. Retails at $49.95.

All enclosed

Sylvania has a new 150-watt light bulb for kitchens which is no larger in diameter than a 100-watt bulb, but gives half again as much illumination. Calls it "Kitchen Lite."

Souped up

New Home Sewing Machine distribution in San Diego has been taken over by Gold E Distributors Inc.

Distribute

Du Mont is featuring an eye-catching, three-color football display, available to its dealers to point up sports entertainment on 19-in. Du Mont TV sets. Display includes two standing cartoon style cut-outs of five youngsters, plus cartoon drawing of a football game which fits over the tube face. . . Will run national ad campaign in newspapers to introduce its 1951 line.

TV display

Admiral recently introduced two new television sets, both 14-in. tubes, one a table model, the other a console. Both are priced under $200. . . Has increased prices on its refrigerators and ranges, from $10-$30.

Two new

Thor recently promoted Harley A. Payne, former acting manager of the Thor branch office at Seattle, to Pacific Northwest district sales manager. With offices at Seattle, Payne will work with Thor distributors at Seattle, Spokane, Portland and Butte. Thor has closed its Portland branch and put the territory on a distributor basis, with Robert L. Rice Co. as distributor. Rice was former branch manager for Thor.

Changes

Dulane Inc. has brought out two new products—Coffrrrk, an automatic drip coffee maker, twin bowl type with separate heating elements in both the upper and lower sections; Butterrrk, an accessory that fits any model refrigerator for keeping butter at desired temperature.

Both electric

Robert F. Clark Co., Denver, is new distributor for Blackstone Corp., covering the state of Colorado and counties in Wyoming. Thomson-Diggs Co., San Francisco, takes over as distributor for California and Nevada, replacing Pioneer Appliance Co.

Two named

Meck's new line of TV receivers feature five models ranging in price from $179.50 for a 14-in. table top to $349.50 for a 19-in. console.

Five models

Western Winter Market at San Francisco Merchandise Mart will be held Feb. 5-9. Western Gift, Toy and Housewares Show will be on concurrently. — Looking ahead

New president of San Diego Bureau of Home Appliances is R. T. Redfield, branch manager of Graybar. Gordon Dawson is first vice-president; George Stoltenberg second vice-president; Sam L. Hall treasurer. — Bureau leaders

San Francisco TV sales hit another new high with sales reported in August at 4,373, 19% above July; brings total sales to 79,000. Only limiting factor for the rest of the year will be supply. . . Los Angeles total for August was 50,472, bringing the total to 693,369—almost double the sets in use since the beginning of the year.

R. O. Boynton has been made manager of the newly created Western vacuum cleaner region for Eureka Williams Corp. His territory includes Los Angeles, San Francisco, Portland, Spokane, Salt Lake City, Billings and Phoenix. — Manage

Fowler Mfg. Co., Portland, makers of electric and gas water heaters, announces a change in its distribution and sales policy. Fowler products will be handled by recently appointed distributors in Portland, Seattle and Spokane, rather than by Nash-Kelvinator Sales Corp., which will continue to distribute Fowler heaters under the Kelvinator name only. Distributor in Portland is Appliance Wholesalers; in Seattle Schwabacher Hardware Co., and P. R. Connelley Co.; in Spokane Columbia Electric & Mfg. Co. — New set up

Production of wall insert radiant Heatairas of 1,000 and 1,250 watts with built-in thermostats is announced by Markel Electric Products and La Salle Products. All Heatairas are Underwriters' approved. — Heaters

Cory has simplified its glass coffee brewer parts problem for dealers by sending them a detailed parts chart showing at a glance the complete component parts for each model in the company's line. . . Also announces that it is packing its patented plastic safety stand and plastic coffee measure with the recently introduced custom model ACB deluxe automatic coffee brewer. — Make it simple

New Seth Thomas clocks for the fall season are the Kenbury, self-starting electric Westminster chime clock; Pippin, kitchen wall clock in four color combinations; Baxter, electric time clock, now available in red and black lacquered cases. — All in time

Whirlpool has redesigned its 1951 automatic washing machines and electric clothes dryers. Control panels have been moved to the back for better visibility and safety. . . Recently brought out a new automatic washing machine with 9-lb. capacity, priced at $199.95. — New look

Kane Co., S. F. Mart, has been appointed factory rep. in northern California for Conlon Bros., makers of White Way washers. — Washer rep.

Portable radiant heater has been added to the line of Emerson-Electric combination radiant and fan-type heaters. Available in bronze or ivory enamel finish with chrome plated trimmings. Lists at $15.95. — Add

Quinterra, type 6, being used as interlayer insulation in a Marcus distribution transformer.

MARCUS TRANSFORMER CO., Inc.

MANUFACTURERS AND DESIGNERS OF STANDARD AND SPECIAL TRANSFORMERS

22-24 MONTGOMERY STREET MILLBURN 3, NEW JERSEY

Mr. R. B. Woodford
Johns-Manville Sales Corporation
22 East 40th Street
New York 16, New York

Dear Mr. Woodford:-

Now that we have been using Quinterra electrical insulation for over a year, we believe you will be interested in our experience with it. During this period, we have produced over 10,000 air cooled transformers, ranging in size from 1 KVA to 2000 KVA with voltages to 13,800 volts.

When Quinterra was first introduced we became interested. We felt its high temperature dielectric properties and uniform smooth texture would permit us to produce long lasting transformers with better space factor as to insulation thickness. Our beliefs have been completely confirmed. Rejection of completed units under our own severe tests have been practically eliminated. Products are running more uniform in size. Production has increased. Complaints from the field involving Quinterra insulated transformers are negligible compared to what was considered normal previously.

Our use of Quinterra consists primarily of layer insulation and a small amount for our tape and as wrapper and ground insulation. Compared with insulations previously used for these applications, besides getting a far superior product, we found a material saving in our costs. This saving has run as much as 20% for the insulation required in certain transformer sizes.

We believe Johns-Manville has made a vital contribution to the life and safety of electrical devices through its development of Quinterra.

Very truly yours,
MARCUS TRANSFORMER COMPANY, INC.
Alvin Marcus
President

AM:eeg

NEMA

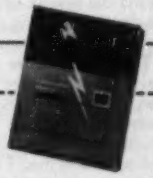
Can you match these *Quinterra* savings in transformer production?

THIS LETTER from Marcus Transformer Co., Inc. tells about both production and use advantages of Quinterra . . . the revolutionary new purified asbestos, high temperature electrical insulation.

—And it tells about actual savings and customer satisfaction in typical operations with this flexible, continuous sheet insulation. Quinterra is being widely used for interlayer and wrapper insulation in transformers and coils. Its lasting dielectric strength assures a greater safety factor and longer operating life. Quinterra withstands higher temperatures than the hot-spot limit of 130C for Class B insulations.

QUINTERRA

- ✓ **cuts factory rejects**
- ✓ **reduces complaints**
- ✓ **improves production rate**
- ✓ **produces more uniform product**
- ✓ **cuts costs of operations**



Johns-Manville ELECTRICAL INSULATIONS

Johns-Manville
Box 290, New York 16, N. Y.

Kindly send me a copy of
Johns-Manville Quinterra Electrical Insulation EL-34A.

Name_____

Company_____ Position_____

Address_____

City_____ State_____

A model living-dining room area, light conditioned in accordance with the lighting recipes. In addition to four portable lamps with proper wattage and a dining ceiling fixture, general lighting comes from a room-length valance and lighted wall cornice. Extras suggested are spotlamp for the picture, bookcase panel and two ceiling spots over the flowerbox which divides the room at the desk

RECIPES—
the Practical Approach to Home Lighting

Simple recipes, with tape-measure directions, may be the key to unlock the home market for lighting. Certainly the industry has beat its brains out trying to find such a key, and this may be *it*.

This new approach to home lighting was first hinted at at the recent Illuminating Engineering Society national conference at Pasadena when Eugene W. Commery, illuminating engineer in charge of residential lighting activities, General Electric Lamp Department, Nela Park, Cleveland, presented the results of a study of the IES residential lighting committee on seeing tasks in the home.

This study of the dimensions of people, the chairs they sit in to read or sew, tables and desks at which they study, powder their noses, of sinks at which vegetables are prepared, stoves and workbenches, Commery said, had led to preparation of a series of simple recipes. These recipes are for the placing of common home lighting devices —floor lamps, table lamps, end table lamps, pin-to-wall lamps, desk lamps, window valances—where they will do the most to provide good seeing conditions.

Immediately following the IES conference, Commery presented to several Western groups the new program that General Electric is launching, built on the foundation of these basic lighting recipes, together with 10,000 homes in which to demonstrate them. It will be called the "Home lighting conditioning program." It is designed around 26 specific recipes for typical home seeing tasks or conditions. The IES study defined the amount and extent of light needed. The G-E recipe offers specific directions to light each, either with existing equipment at low cost, or more luxuriously with new equipment being made for the purpose.

Instead of prescribing lighting for entire rooms, the new simple approach calls for lighting *tasks* or *activities* wherever they are performed. The recipe or formula for lighting each can be applied in any room or in several.

As an example, the recipe for reading while seated in a chair can be applied wherever one reads while seated in a chair; that for studying or working at a desk or table can be applied wherever that sort of task exists.

The recipes not only tell where to place the portable lamp or lighting fixture but tell in simple terms its performance characteristics—such as size and type of lamp, kind of shade or diffusing bowl, etc.

Recipes are furnished for: (1) *General lighting* with wall or window valance. (2) *Dining space* with ceiling fixture plus cornice light. (3) *Kitchen* with ceiling fixtures, wall fixtures, undercabinet fixtures. (4) *Bedroom* with ceiling fixture, wall fixture, dresser and floor lamps. (5) *Reading while seated in upholstered chair or sofa*, with floor lamp. (6 & 7) With table, wall lamps. (8) *Reading, writing or drawing, seated in straight chair at desk or table*, with table lamp. (9) Same with wall lamps. (10) Same with fluorescent lamp. (11) *Reading, seated in bed*, with table lamp. (12) Same, with wall lamp. (13) Same with fluorescent wall bracket. (14) *Reading piano music, seated on bench*, with pair of torcheres. (15) *Hand sewing, seated in upholstered chair*, with floor lamp. (16) *Facial makeup, seated before dressing table or vanity*, with dressing table lamps. (17) Same, standing before dresser, with dresser lamps. (18) *Shaving and facial makeup standing at bathroom mirror*, from wall and ceil-

YOUR Sales Idea CAN WIN A 1950 Hughes Award

. . . You can serve two very useful purposes by entering the 1950 Hughes Award Competition . . .

. . . Bring Electrical Living to More American Homes . . .

. . . Win a prize in the 1950 Hughes Award Competition . . .

Bringing electrical living to more American homes is, of course, the idea back of the Hughes Award Competition. How your utility company best accomplishes this is the basis for the Hughes Awards.

The size of your company or the conditions in the territory you serve will have no bearing on the decision of the judges. Likewise, elaborately prepared entries will have no advantage over simple, documented case-histories of successful sales programs.

The winners will be individuals and utility companies submitting successful sales methods, new or old, which have proved effective in solving a major appliance merchandising problem in their area.

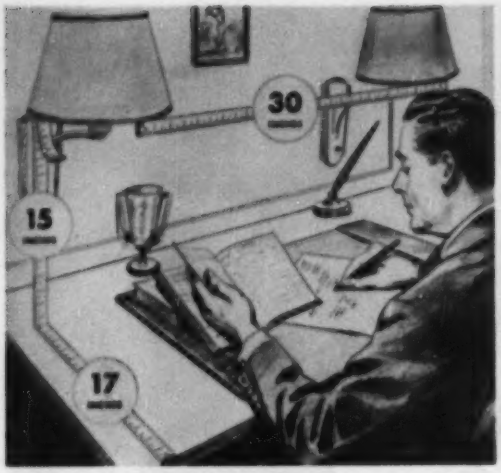
Arrange now to enter the 1950 Hughes Award Competition. Write to Edison Electric Institute, 420 Lexington Ave., New York 17, N. Y., for 1950 Hughes Award Booklets.

UTILITY DIVISION

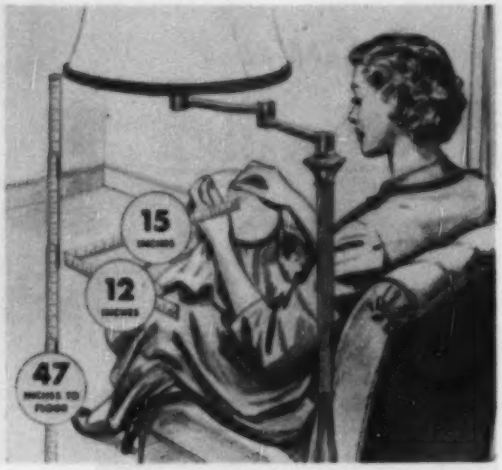
Hotpoint Inc.

(A General Electric Affiliate)

5600 West Taylor Street, Chicago 44, Illinois



TYPICAL RECIPES—This is No. 5, for reading, writing or drawing seated at the desk or table, using wall lamps. Note the spacings



FOR HAND SEWING, seated in an upholstered chair, No. 11, recipe, height of lamp shade from floor and distance to task is pictured

ing fixtures. (19) *Food preparation, standing at work counter,* lighted from undercabinet fixture. (20) *Kitchen duties, standing at sink or range,* with ceiling fixture. (21) *Food preparation, standing at range or sink,* with wall fixture. (22) *Laundry work, standing at laundry trays,* with ceiling fixture. (23) *Hand ironing, standing at ironing board,* with ceiling fixtures. (24) *Machine ironing, seated at ironer,* with ceiling fixture. (25) *Home carpentry and painting, standing at work bench,* with ceiling fixture. (26) *Television viewing, seated,* with general lighting.

Each recipe tells "what to use," "where to place it," "how it helps you" and suggests additional or optional equipment.

These recipes, together with illustrations to show their application, and a list of minimum requirements for a small home and a page on adequate wiring, will be attractively printed in a small recipe book which should get universal distribution.

To further dramatize the program and to make homemakers appreciate by seeing actual applications of these recipes, the program calls for the creation across the country of 10,000 demonstration light-conditioning homes by the end of 1951, an average of one per each 4,000 residential electric meters. The electric service companies are being asked to assist in interesting operative home builders. Manufacturers of lighting fixtures and portable lamps and the retailers handling such items are to be enlisted in the program.

The utility will be asked to organize, coordinate and operate the demonstration home phase of the program. It will select the homes to light condition. It will help select, secure and supervise the installation of equipment that meets the recipes. Its personnel will aid in demonstrating the homes.

General Electric Co. has offered to furnish the lamp bulbs for the demonstration home, as well as lighting recipes and over-all guidance. It will also do national promotion. One of the leading home and garden magazines will feature its own interpretations of the recipes to actual homes. Undoubtedly others will do similarly.

Equipment manufacturers will be asked to supply catalogs, samples of their equipment. Retail stores will lend portable lamps and furnishings. Home builders will be encouraged to install the lighting conditioning equipment in homes selected for demonstration and permit these homes to be open to the public for a period.

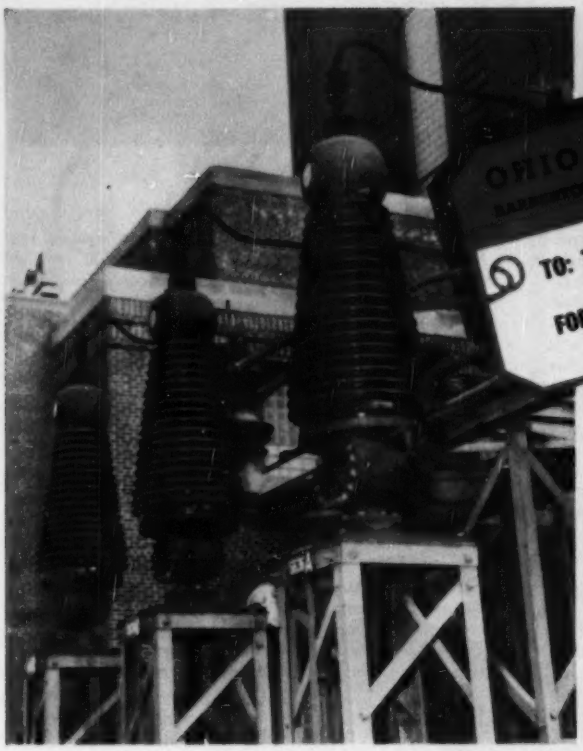
With rulers Eugene Commery applies the recipe for reading while seated in an upholstered chair, using floor lamp for illumination

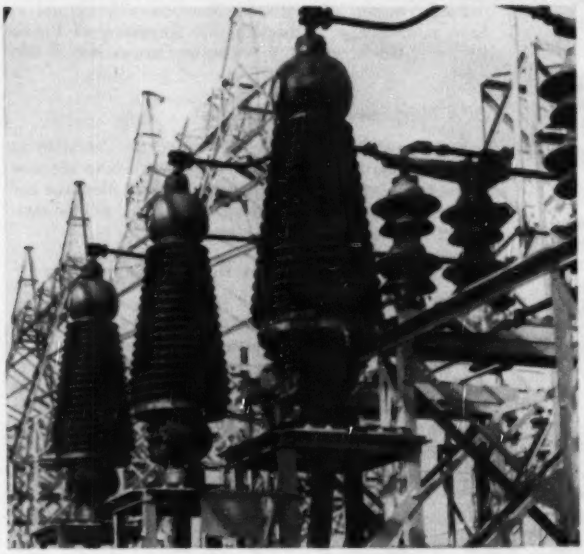
Reasons for lack of good home lighting are said to be that the average home maker has never been shown what it is and how to get it. It is not package merchandise, like a refrigerator. It takes the assembly of various products and their right application. Hence a recipe to be followed has long been needed, one that fits the living habits and seeing needs.

Adequate retail distribution of the more desirable portable lamps and fixtures has been another lack. And for years no one has done any sustained merchandising of them.

All of these were considered and are felt to be overcome by this simple approach which Commery explained in detail. Through the coordinated efforts of virtually the entire lighting industry—for the program fits anybody's make if the equipment does what the recipe calls for—and with new and improved light sources and lamps, this program is the best answer to the up-to-now hopeless home lighting situation. Manufacturers of fixtures and portables are already beginning to produce full lines designed to fill the lighting recipes and to make them available on a nation-wide basis.

The woman's appeal is one which is natural. She uses recipes for cooking and recipes for home decoration. Now she can follow simple recipes for home lighting, add her own touch of decoration and personality to it, and seeing can come back into fashion in the home.





Add to the complex requirements of a high voltage bushing, the extra demands imposed by retaining oil at a constant pressure of 200 pounds, and you will appreciate the high degree of specialization involved in O-B Oilostatic Potheads.

Shown here are two installations of these Potheads at opposite ends of a 9.25-mile circuit connecting the Southwark Generating Plant and Westmoreland Substation of Philadelphia Electric Company. Some of the characteristics of this installation are briefly described by the makers of Oilostatic cable, The Okonite Company.... "Voltage, 66 kv, 880 amperes, 105,000 kva rating. Load factor, 90 per cent. Three conductors in single 6¼-inch pipe. Conductor size, 1,500,000 cir mils. Copper temperature, 75 degrees C. Insulation thickness, 0.35-in. And, equipped with..."

POTHEADS

AN ESSENTIAL PART OF OILOSTATIC CABLE

Ohio Brass MANSFIELD, OHIO

THE MONTH IN BRIEF

BPA Will Not Renew Firm Contracts

Bonneville Power Administration has notified five private power companies in the Northwest that it will make no firm power contracts with them this year. BPA officials said that load growth in public agencies had absorbed all but a small amount of the firm power remaining in the federal system. Interruptible power will be sold to the private companies, however, and on this basis their demands can be met so long as the Columbia flow is average or better. In the 1949-50 period the five companies had contracts for 311,000 kw. of firm power from Bonneville, distributed as follows: Portland General Electric, 130,000 kw.; Pacific Power & Light Co. and Washington Water Power Co., 120,000 kw.; Puget Sound Power & Light Co., 50,000 kw. and Mountain States Power Co., 11,000 kw.

Utility Wins Franchise

Public Service Co. of Colorado had operated at Brighton, Colo., without a franchise for nine years, until a recent election granted a 20-year contract for electric and gas service. Majority favoring the proposal was almost two to one—894 for and 482 against. The voting resolved a city council dispute on which members were almost equally divided. By a 5-4 majority they gave the nod to the private utility but voted unanimously to refer the issue to the electorate. Public Service Co. officials agreed to rest their case with the people. Under the new franchise, the company pays to the city of Brighton 2% of its gross revenue from sale of gas and electricity within the corporate limits with a minimum payment of $5,250 annually. This franchise is the 51st negotiated between the company and Colorado cities since 1940.

Ads Urge Voters to Approve Purchase

Some $36,000 is being spent in newspaper and radio advertising to convince Seattle voters they should approve the proposed $25,850,000 municipal purchase of Puget Sound Power & Light Co. properties when they go to the polls on Nov. 7. A citizens' committee appointed by Mayor William F. Devin will spend some $15,000, Puget Power is expected to spend nearly that much and City Light reportedly will spend $7,000.

Silver Gate's Third Unit On Line

San Diego Gas & Electric Co.'s Silver Gate unit No. 3 has gone on the line, adding 50,000 kw. to the company system. Another 50,000-kw. turbogenerator is on order for delivery in 1952. The present installation cost $6,850,000 and is part of a $12,500,000 expansion program for 1950. L. M. Klauber, board chairman, estimates total investment in plant and equipment since the close of World War II is $50,000,000. The new unit operates at 1,250 lb. steam pressure and 950° temperature. The company decided on the higher pressure and temperature because of expectation of higher fuel prices. The unit's single boiler is suspended on springs from overhead steel beams.

Permanent Injunction Issued

A permanent injunction has been issued against Los Angeles AFL building and trades unions that tied up work on eight Department of Water & Power projects in 1948. The work stoppage followed a union demand that the department require its civil service employees working on the jobs to join unions or that it give the jobs to private firms employing AFL members. The department took the case to court and won a temporary injunction.

Town Ups Space Heating Schedules

A new electric space heating rate schedule aimed at persons who made installations in 1949 and 1950 against the wishes of the city is being considered by Ellensburg, Wash. Under the proposed schedule, the first 10 kw. of demand would be free, with a charge of $1 per kwh. thereafter. The first 1,000 kwh. would take regular billing, with everything over that 1½c a kwh., instead of ¾c as at present. A person using 18 kwh. per month would pay $8 plus the regular rate for the power regularly billed. Customers who made space heating installations before 1940 would be exempt from the new rates until 1954.

Seek PUDs for Montana

Public power advocates in Montana will attempt to have a law passed authorizing the formation of Public Utility Districts similar to those in Oregon and Washington.

BPA Marketing Area Enlarged

Requests that the Bonneville Power Administration be named the marketing agency for southern Idaho are now before the Secretary of the Interior. Western Montana and southern Oregon were recently included in BPA's marketing area.

Hood River Voters Reject Bond Issue

Voters in rural precincts of Hood River County, Ore., turned down the proposed $1,000,000 PUD bond issue by a vote of 1,014 to 729. Purpose of the bond issue was to buy out the Hood River Electric Cooperative and acquire through purchase or condemnation facilities of Pacific Power & Light Co. in the county. The September election was the second time rural voters have refused to put the Hood River PUD into business.

County Won't Join Cloud-Seeding Pact

Threat of liability for damages caused by cloud-seeding has caused Santa Barbara (Calif.) County board of supervisors to decline participation in a cloud-seeding pact. Santa Barbara County, along with its various water districts, had contributed money for a county-wide seeding survey which showed rainfall could be doubled. But fear of damages has put the county out of the pact—at least temporarily. The supervisors announced that they had only been assured of obtaining a $50,000 insurance policy—which, they said, "is totally inadequate."

Eyes Right!

RIGHT LIGHTING

● The eyes have rigid requirements in efficient lighting. Smoot-Holman certified illumination meets those requirements with unvarying quality and performance created by superior engineering and skill. Beauty, high efficiency and dependable operation are the hallmarks of the finer lighting equipment that bears the Smoot-Holman label in institutional, commercial and industrial installations.

ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA ®
MADE IN U.S.A.

OFFICES IN PRINCIPAL WESTERN CITIES — BRANCH AND WAREHOUSE IN SAN FRANCISCO

Tough

TOUGH WIRE

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FOR TOUGH WINDING JOBS

High tensile strength eliminates wire breakage.

High abrasion and shock resistance assures ability to wind compactly at high speeds and around sharp radii without film damage.

Toughness can still be had with wire that is soft and ductile.

To prove it, specify Essex Extra Test Magnet Wire for your tough winding jobs.

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WIRE SX PRODUCTS

Plants: Fort Wayne, Indiana; Detroit, Michigan; Anaheim, California. Warehouses and Sales Offices: *Atlanta, Georgia; *Boston, Mass.; *Chicago, Ill.; Cleveland, Ohio; Dallas, Texas; Dayton, Ohio; *Detroit, Mich.; *Kansas City, Mo.; *Los Angeles, Calif.; Milwaukee, Wis.; *Newark, N. J.; Philadelphia, Pa.; *Portland, Oregon; *St. Louis, Mo.; *San Diego, California; *San Francisco, California.

EXPORT SALES OFFICE—LIONEL-ESSEX INTERNATIONAL CORPORATION, 15 E. 26th ST., NEW YORK 10, N. Y.

QUICK INSTALLATION!

STANDARD METER SOCKETS

R-1 socket is easily mounted, has roomy space for wiring

Mount and wire the socket, then with a simple snap of the sealing ring the socket and meter are assembled. It's as easy as that.

Once installed, R-1 sockets can be forgotten. The stainless-steel sealing ring, plus the baked-on lacquer finish, combine to produce a corrosion- and weather-resistant assembly. Ask your G-E representative for full details. Or write for bulletin GEA-5147. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

Quick-hitch sealing ring requires no tools

Socket with meter in place is sealed against the elements

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

THIS MONTH'S NEWS

Commission Asks Ruling on Override of State Law

Following city of Tacoma's contention that it can build hydroelectric dams on the Cowlitz River if it gets FPC approval, the Washington State Game Commission last month asked the state attorney general for an opinion as to whether the federal commission may override the laws of a state.

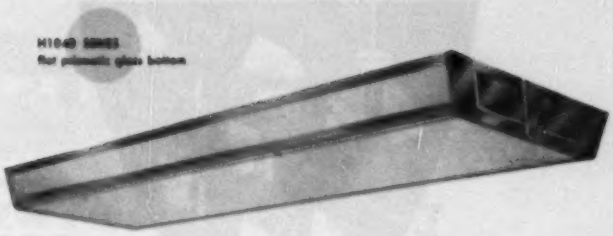
The last state legislature established the Cowlitz watershed as an inviolate fish sanctuary, but Tacoma nevertheless applied to the FPC for permission to build two dams. One hearing was to be held by the FPC on the application Oct. 3 in Washington, D. C., and a second will be heard about Nov. 1 in an as yet unselected western Washington city. Tacoma maintains the river comes under federal jurisdiction and thus the state action is illegal.

The game commission has asked the attorney general to give an opinion on whether the FPC has jurisdiction to hold a hearing over disposition of a stream entirely within the state, whether FPC has a right to license in derrogation of state law and whether, in case the FPC has such a right, Tacoma can begin work immediately on the dams it proposes.

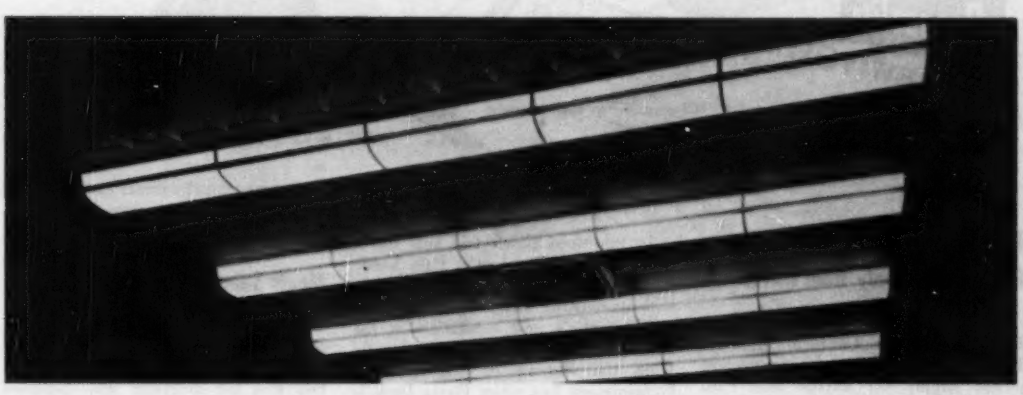
PUD Requests Take Over of Richland Electrical System

The Benton County PUD of Prosser, Wash., has asked permission of the U.S. Atomic Energy Commission to take over all electrical facilities in the nearby city of Richland, operated by the commission in connection with the Hanford Works. Under the PUD proposal, all electricity in the city would be metered. PUD rates now being developed for electrically heated homes "will be among the lowest in the nation," according to Owen Hurd, PUD manager. The PUD would build an office and station building in Richland.

● Ashcroft Water & Electric Co. has completed the development of a new plant and dam on the Bonaparte River. Service has been extended to Cache Creek, six miles north of Ashcroft, B.C. The new plant will supply 500 hp., while the original plant with similar capacity will continue in service.



new SUNBEAM fixtures styled for distinguished interiors



These new SUNBEAM luminaires provide controlled light distribution through hinged Controlens* and prismatic glass elements. Combining low surface brightness with a strong downward component of light, these units are completely enclosed for minimum maintenance.

Simplicity of line and generous proportions characterize these fixtures for interiors where modern dignity is the keynote.

The sturdy bottom frames features a full-length piano hinge and vibration proof, spring-loaded latches.

Both series available in 2, 3, and 4-lamp 48", 72" and 96" lengths.

The slimline units available in all milliamp ratings

*(R) Holophane Co., Inc.

SUNBEAM LIGHTING COMPANY • 777 EAST 14TH PLACE • LOS ANGELES 21, CALIFORNIA

smart accent for modern living
For the finest in contemporary lighting see Prescolite's new Swiv-O-Lite line. Decorative distinction and rigid construction—in a wide range of functional designs for commercial, portable and pin-up installation. Available in six decorators finishes—coral, green, gray, satin chrome, brass and bronze.
PRESCOLITE'S new
accent lighting
SWIVOLITE
to complement the popular Prescolite recessed fixture line. Write today for complete catalog and price information.
* individually packed—one fixture to a carton
800 Bancroft Way, Berkeley, Calif.
Prescolite
SWIVOLITE
is a product of Prestcol Company
your best source for commercial, portable and pin-up modern lighting fixtures

Power Exchange Gives Utility Permanent Supply from Davis

In a power exchange deal with the U. S. Air Force, California Electric Power Co. has obtained a permanent power supply for Blythe and Palo Verde Valley, Calif., from Davis Dam.

In a three-way arrangement, the Air Force will deliver all the power from its Davis Dam allotment which Calelectric needs to supply its customers in the Palo Verde Valley-Blythe area. In turn, the power company will supply exchange energy up to an equal amount for the power required by Edwards Air Force Base at Muroc, Calif. This will result in a considerable saving in electrical operations at the air base.

Under a 21-year contract with the U. S. Air Force, Calelectric will construct a new transmission line from its facilities at Kramer junction to the Muroc Air Base and will install a 6,000-kva. substation. The new Muroc facilities will cost about $400,000. Provision will be made at the substation to increase its ultimate capacity to 20,000-kva.

In addition, Calelectric will invest more than $50,000 in the Palo Verde Valley to connect the new power supply with its existing distribution system.

Calelectric's new substation at the Blythe airport will be supplied directly from the Bureau of Reclamation's transmission line when Davis Dam is completed sometime in 1951.

The Air Force power allotment comes from its share of the Davis Dam output apportioned by the U. S. Bureau of Reclamation.

Calelectric says that the new power supply should eliminate any prolonged interruptions of electric service in the Palo Verde Valley, other than those caused by severe local storms.

● Douglas County PUD of Bridgeport, Wash., has taken over operation of the $1,028,000 system in Douglas County formerly owned by Washington Water Power Co. Since its acquisition from WWP several years ago, the system has been operated by the Chelan County PUD. William T. Nordeen has been named resident manager for Douglas County PUD, with offices in East Wenatchee.

Office Building Purchase Meets Snag in Seattle

A City Light plan to buy a downtown office building in Seattle has met with opposition from real estate interests and the architect who designed the City Light building, with the result that the plan has been referred to a committee of the city council.

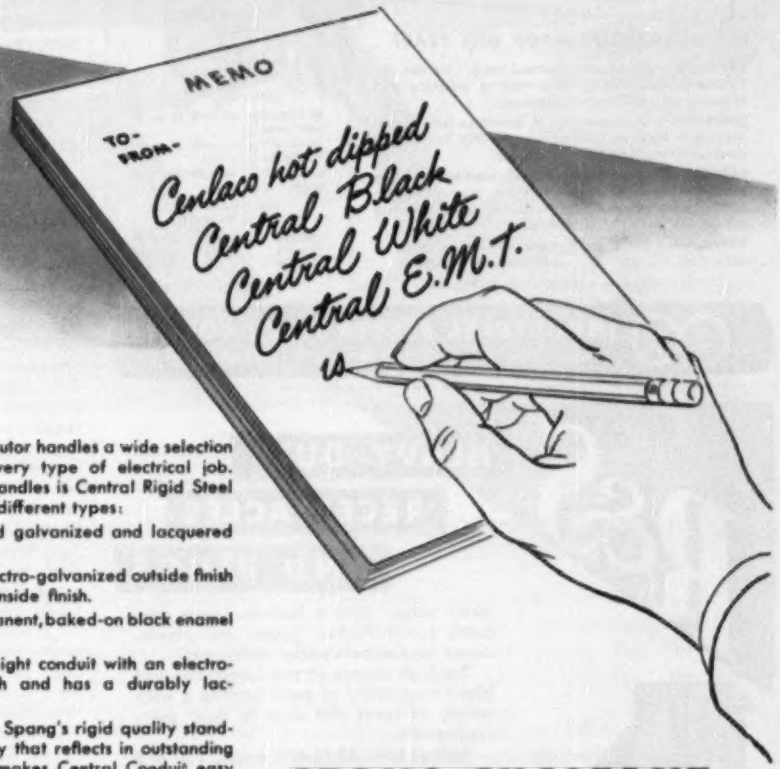
The Seattle Real Estate Board objects to City Light's proposed purchase of the building for a reported $800,000 on grounds that the purchase would take it off the tax rolls.

Architect Earl W Morrison pointed out that the block-long two-story City Light Building has foundations for a 24-story tower. He contended the city could build additional stories "at no greater cost on an area basis than you would pay for the office building," and have the added advantage of a new structure. Cost of a 10-story addition is estimated at $1,300,000.

City Light officials have favored purchase of the office building rather than construction of a tower, contending towers are expensive to maintain as well as to build.

YOU NAME IT...

...YOUR CENTRAL CONDUIT DISTRIBUTOR HANDLES IT



Your Central Conduit Distributor handles a wide selection of quality products for every type of electrical job. Among the many lines he handles is Central Rigid Steel Conduit that comes in four different types:

Cenlaco has a hot dipped galvanized and lacquered finish.

Central White has an electro-galvanized outside finish and a black enameled inside finish.

Central Black has a permanent, baked-on black enamel finish inside and out.

Central EMT is a light-weight conduit with an electro-galvanized outside finish and has a durably lacquered inside finish.

All four types are made to Spang's rigid quality standards. It's the kind of quality that reflects in outstanding product performance . . . makes Central Conduit easy to cut, bend and thread . . . standards that help you save time on the job.

When you need conduit or other electrical supplies, call your Central Conduit Distributor. In spite of the great demand, he'll do everything in his power to fill your order as quickly as possible.

SPANG-CHALFANT

Division of The National Supply Company
General Sales Offices: Grant Bldg., Pittsburgh, Pa.
District Offices and Sales Representatives in Principal Cities

CENLACO a hot dipped galvanized and lacquered finish, inside and out.

CENTRAL WHITE electro-galvanized outside and black enameled inside.

CENTRAL BLACK permanent, baked-on black enamel finish, inside and out.

EMT—Light-weight electro-galvanized outside and durably lacquered inside.

magno-tronic
DUAL SILVER POINT — FULLY AUTOMATIC
FLUORESCENT STARTERS

—completely eliminate annoying blinking and flickering of dead fluorescent lamps!

GUARANTEED — FOR ONE YEAR!

PROTECTS — Automatic thermal relay cuts out defective lamps, eliminates annoying blinking and protects all auxiliary equipment.

SIMPLIFIES — Replacement of defective lamp automatically recycles starter circuit. No buttons to push — no replacement of starter.

REDUCES COST — Magno-Tronic starters provide exact timing of electrode heating, preventing excessive loss of emission material, thus assuring maximum possible lamp life.

VERSATILE — Built to operate efficiently over an extended voltage and temperature range.

Demonstration and Literature on Request.

SP-15-20 For use with 15 or 20 watt lamps.
SP-30-40 For use with 30 or 40 watt lamps.
SP-85-100 For use with 100 watt lamps.

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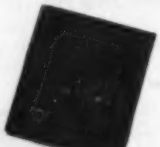
R&S HEAVY DUTY RECEPTACLES AND PLUGS

Many unique built-in features insure adequate safety factors, assure low maintenance, and allow ease of installation.

The high degree of standardization and interchangeability of parts provide a wide variety of types and sizes to meet every requirement.

Ratings from 30 to 400 amps., 250 and 600 volts.

VAPORTIGHT WATERTIGHT AND EXPLOSION-PROOF



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Precision-Built Electrical Equipment
125 BARCLAY STREET, NEW YORK 7, N. Y.

CALELECTRIC TO BUILD STEAM-ELECTRIC PLANT

California Electric Power Co., Riverside, Calif., will begin construction of an $8,000,000, 60,000-kw. steam-electric generating plant in San Bernardino County as soon as final design details are completed.

The initial installation will consist of two 30,000-kw. units of outdoor type, and boilers fueled by either natural gas or fuel oil. According to Carl C. Ernst, vice-president and general manager of Calelectric, who is in charge of planning, engineering and construction of the new plant, the facility will give the company a more flexible and economical power supply.

Eventual capacity of the steam plant will reach 90,000-kw. with installation of a third 30,000-kw. unit at a later, unspecified date.

The plant is scheduled to get into operation in January 1953. It will be built near the company's present San Bernardino substation which is the load center of the company's system. This will cut to minimum the amount of high-voltage transmission line necessary to connect the new plant with the rest of the electric system.

Originally the new steam plant was scheduled to begin construction in 1952, with completion during 1954. Southern California's rapid growth, coupled with the Korean outbreak, encouraged the schedule's speed-up.

California Electric Power presently serves five major military installations, including March Air Force Base at Riverside; Norton Air Force Base at San Bernardino; George Air Force Base at Victorville; the Naval Ordnance Test Station at Inyokern; Edwards Air Force Base at Muroc, Calif.

Calelectric's present power supply is predominantly hydroelectric. The company operates for stand by only one small steam plant of 8,000-kw. in San Bernardino.

Company officials predict it will be one of of the nation's most efficient for its size. The Fluor Corp., Los Angeles, will design and construct the plant.

Orders have already been placed with General Electric for the turbo-generators and with Allis-Chalmers for condensers.

● PASADENA city officials have passed an ordinance prohibiting parking in the vicinity of the city's 75,000-kw. steam plant. A spokesman said this was merely a precaution and a re-enactment of a World War I security measure. The no-parking law probably will not be enforced yet but would be on the books if needed, he said.

ALL TYPES and SIZES. Yoke-and-Nut Type, No. 10 to 1,000,000. Also Service Entrance, Service Post and Special Connectors (widest variety— more are shown below)

Penn-Union Service Connectors have accurate machine-cut threads, and carefully chamfered edges — do not catch in lineman's gloves.

Durable — re-usable over and over. Fully approved by Underwriters' Laboratories and the highest authorities in the utility field, for the most exacting service.

Penn-Union also makes the *complete* line of Tee Connectors, Cable Taps; Straight, Parallel, Elbow and Cross Connectors; Bus Supports, Clamps, Spacers; Ground Clamps, Terminal Lugs, etc., etc.

Leading users found that "Penn-Union" on a fitting is their best guarantee of Dependability.

Kenneth Anderson Co.
412 Seaton St.
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PENN-UNION ELECTRIC CORPORATION, ERIE, PA.

THE *COMPLETE* LINE OF CONDUCTOR FITTINGS

PENN-UNION

A SAFETY TOOL

For Severing the Binding Straps on Carloads of Poles

Although a new tool, this Wire Cutter has been developed through actual use in the field, in cooperation with public utilities, and its present design has proved most efficient and durable.

No. 1-SC Wire Cutter

The necessity for a tool to be used in severing the binding wires on carloads of poles has long been evident and the Bartlett Mfg. Co. has now produced a Wire Cutter that can be operated at a safe distance from the load and capable of cutting 4 strands of No. 7 bare wire at one stroke or 2 inch steel strapping.

This tool is made with a sturdy head, having a hardened hook with serrated edge, and the blade is made of ⅜" crucible tool steel and operated by a pull lever, to which double links are attached.

The Compound Lever action of this side-cutting tool is similar to our Patented Compound Lever used in many of our other tools.

The cutting power is three to one at the head and further increased by the lever action on the side of the pole to which the rope is attached.

The poles are straight grained laminated, 1⅛" x 1⅜", treated to prevent moisture absorption.

As do our other products, No. 1-SC Wire Cutter carries a full guarantee.

Manufacturers of quality tools for more than 35 years, pioneers of the insulated tree trimmer in the utility field, we are proud of the fact that Bartlett Tools are standard with most leading utility companies.

Write for complete catalog and further details.

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3003 East Grand Blvd. Box 13, Detroit 7, Mich.

GEO. E. HONN CO., Agents
420 Market St., San Francisco, California

ENGINEERS PLAN RADIO CHECK OF WATER LEVELS

Plans have been worked out by the Corps of Engineers for automatic checking by radio of water levels in the Bonneville Dam reservoir on the Columbia River. Under the system the power house at Bonneville Dam will be able to chart exact water depths at three points up river from the dam, giving operators of power units at the dam up-to-the-minute reports on the water supply approaching the turbines and generators.

The three gaging stations will be installed in concrete towers, each about 50 ft. high, which will be erected at Stevenson, Wash., 6 miles from the dam, Hood River, Ore., 24 miles away, and Lyle, Wash., 37 miles upstream. Each tower will be fitted with a system of gears and revolving arms which will produce code signals showing the water level to within .01 ft.

This is to be accomplished through operation of a radio network. A transmitter at the Bonneville power house will send a tone signal to a relay station on the side of Augsburger Mountain, 15 miles east of the dam. This station will relay the tone to the gage station which is tuned to that tone, and the signal will activate the transmitter in that station, which will in turn operate the coding arm and send a message back to the relay station giving the water depth at that instant.

After the coded signal reaches the power house and is recorded, the tone will be changed and the process repeated with another station, and so on six times an hour.

Radio engineers of the Portland district office of the Corps of Engineers claim the system will be faster, more accurate, and more economical than man-operated reports.

B. C. Commission May Expand Hart Development

Expansion of the John Hart power development by the B. C. Power Commission on Vancouver Island is under consideration.

Since this plant was developed two large new pulp mills have gone into operation on Vancouver Island, one at Alberni and one near Nanaimo. Now a $40 million pulp and paper mill is planned for Duncan Bay, almost beside the John Hart development. Several other industrial projects are also rapidly taking shape on Vancouver Island. As a result of this development, B. C. Power officials are giving serious consideration as to whether further expansion of the John Hart project will be necessary.

S. R. Weston, chairman of the commission, said he was not yet prepared to make any statement on the subject, but he admitted that the problem was being carefully studied. At present the John Hart plant is producing 112,000 hp. in four units.

Anchorage City Council Considering Plant Price

The city council and public utilities board of Anchorage, Alaska, are considering what price they should ask the government for the city's Eklutna power plant, on the site of a power development recently authorized by Congress.

Book value on the plant is $1,912,667 while "owner's value" was established some time ago at $3,149,351, according to City Manager Robert Sharp.

Other factors being considered by the city are its loss of $200,000 a year in revenue from profits which it acquires in sale of electricity and how the city will obtain interim power while the government's $20,000,000 Eklutna plant is under construction.

Since the Eklutna project's firm power will be only 16,000 kw., although the peak will be 30,000, Anchorage is wondering how much power it could be guaranteed. The city probably will demand a prior right guarantee of water to produce 3,000 hp. at Eklutna, which is about equivalent to the amount of electricity now being delivered.

Anchorage now buys power from Anchorage Public Utilities at 2½c per kw. and sells it to customers on a sliding scale.

● THE CORPS OF ENGINEERS has awarded a $421,274 contract to Westinghouse Electric Corp., Portland, for supplying a 20,000-kva. alternating-current generator for the Big Cliff Dam power house on the North Santiam River in western Oregon. The generator is to be completed Dec. 1, 1953. Big Cliff Dam will be built below Detroit Dam, one of the major units in the Willamette Basin flood control, power, navigation and irrigation project.

● COMPLAINT against the proposed sale of 1,750,000 shares of Pacific Power & Light Co. stock has been filed with the SEC by the Washington PUD Association of Seattle. Signed by S. A. Sween, an association director, the complaint declares the stock prospectus does not tell the entire story of the company's operations, particularly as to firm power commitments with Bonneville.

STANDARD ENGINEER'S REPORT

DATA

LUBRICANT Calol O.H.T. Grease

UNIT Automotive generator bearing

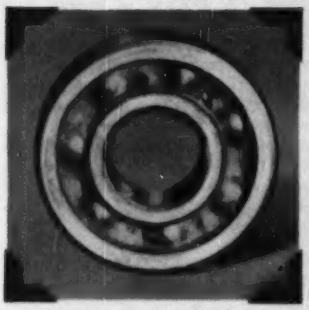
LUBRICATOR Sealed at installation

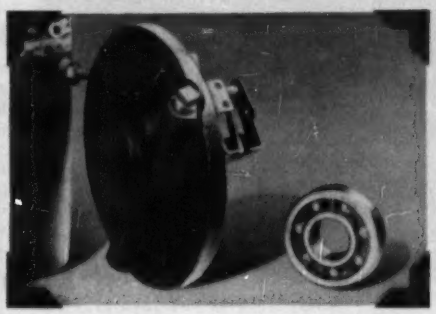
CONDITIONS Heavy-duty diesel truck engine

MILEAGE 70,000

FIRM H. G. Makelim Co., San Francisco - Oakland

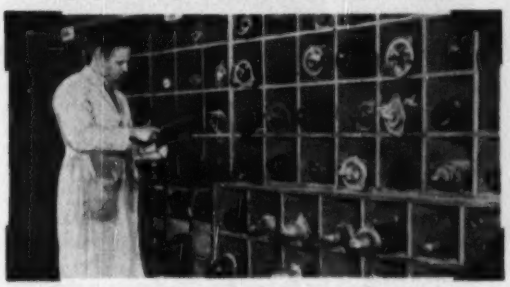
Sealed generator bearing still perfect after 70,000 miles!





ONE APPLICATION OF CALOL O.H.T. GREASE, sealed in the bearings when this diesel-engine generator was assembled by H. G. Makelim Co., prevented any bearing wear in 70,000 miles of heavy-duty truck service. Generator was disassembled at this time only because it needed new brushes, and for general inspection. Note a permanent plug replaces usual grease fitting.

70,000 MILES OF SERVICE did not affect or use up any of the CALOL O.H.T. Grease in the bearings. In special tests, one filling has lubricated bus-generator bearings perfectly for more than 150,000 miles.

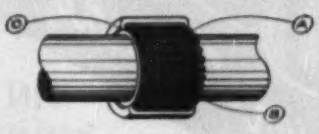


"WITH CALOL O.H.T. GREASE SEALED IN BEARINGS, we recommend installing generators without grease fittings," says Frank Balzarini, H. G. Makelim Co. Foreman. "CALOL O.H.T. eliminates need for greasing between overhauls. And eliminating fittings stops over-greasing—a big cause of wear and trouble."

REMARKS: The H. G. Makelim Magneto Repair Company, San Francisco and Oakland, one of the West's oldest automotive-electrical and carburetor repair firms, specializes in servicing equipment in the toughest automotive service—truck, bus and car fleets.

Besides generator bearings in this service, CALOL O.H.T. Grease is recommended for all types of bearings in service under extremely severe operating conditions.

How CALOL O. H. T. Grease protects bearings in severest operating conditions



Used in any type of bearing under any operating condition, high temperature-low speed, high speeds to 10,000 rpm, temperatures from minus 10° F. to 400° F., CALOL O.H.T. Grease will last indefinitely.

A. Contains special oxidation inhibitor—prevents rusting, corrosion, hardening of grease at any time.

B. Resists high temperatures — eliminates coking.

C. Provides excellent seal against water... lubricates efficiently in slight moisture.

CALOL

STANDARD TECHNICAL SERVICE checked this product performance. If you have a lubrication or fuel problem your Standard Fuel and Lubricant Engineer or Representative will give expert help; or write Standard of California, 225 Bush St., San Francisco 20.

Trademark "CALOL" Reg. U. S. Pat. Off.

STANDARD OIL COMPANY OF CALIFORNIA

Ever-Ready
PIN TYPE
Sockets offer the most convenient and economical means of obtaining outdoor or indoor temorary lighting, since the tedious stripping, soldering and taping operations are eliminated.
In street decoration, construction lighting, carnivals, roadside stands, etc., their ease of installation and convenient flexibility is unsurpassed.
Insist on UNION'S PIN TYPE SOCKETS—the FIRST and the BEST.
No. 43308 & 43318 Standard
No. 44408 Intermediate
No. 11108 Candelabra
Sockets
UNION INSULATING CO.
PARKERSBURG WEST VIRGINIA

PLENTY OF POWER FOR INDUSTRY, MORRIS SAYS

Los Angeles has ample power and water resources to permit a full expansion of local industry to meet increasing requirements for production of defense materials, General Manager Samuel B. Morris informed the city's Water & Power Commission.

The municipal power system has kept ahead of demands for low-cost power, and since the end of World War II has added 290,000 kw. of steam plant electric generation to the city's facilities. Construction now under way on new hydroelectric plants in the Owens River Gorge will provide another 112,500 kw. of energy next year.

In addition, municipal steam generating equipment is now on order by another 200,000 kw., for which generating equipment is now on order by the Water & Power Department.

Expanding industrial water needs can be taken care of through the city's present sources plus increased use of Colorado River aqueduct water, Morris reported.

Four Cities Will Vote on Puget Purchase

Four small cities within King County near Seattle, Wash., will vote Oct. 17 on purchase of Puget Sound Power & Light Co. properties within their respective cities. They are Renton, Kirkland, Kent and Enumclaw; all propose to finance the purchases with revenue bonds. The municipal plans are opposed by proponents of a PUD. The proposed PUD would like to acquire all Puget Power properties in the county outside the Seattle competitive area.

● California Electric Power Co. has broken ground in San Bernardino for its new $96,000 district commercial office building. The main building will be one-story, contain 4,200 sq. ft. and will be surrounded by a reinforced concrete wall. The project will be completed by year's end. The modern structure will feature a 60-ft. wide plate glass and aluminum store front with brick facing and will be constructed of precast steel-reinforced pumice slabs mounted on steel framing. The roof will be a welded steel deck on trusses, with aluminum foil cover, and mineral wool insulation.

● Bonneville Power Administration has added 114 class-of-1950 graduates in engineering to its staff. All but eight are from Pacific Northwest colleges and universities.

NOCRETE *WITHOUT CONCRETE ENCASEMENT*

Orangeburg Fibre CONDUIT NEWS

STANDARD *WITH CONCRETE ENCASEMENT*

MORE BUSINESS — MORE PROFITS FOR THE CONTRACTOR

VOL. 1 NO. 2 OCTOBER 1950 ★★★★

LEADER AND FIRST CHOICE IN EVERY CITY AND STATE!

NOCRETE for One and Two Duct Installations

For single or double duct runs, ORANGEBURG NOCRETE (Type 2) is the *ideal* conduit. Made with heavier walls for installations *without* concrete encasement, *Nocrete* makes possible valuable savings on such installations as — factories, schools, colleges, hospitals, drive-in theatres, power, telephone and other communications systems — also service entrance, parkway and suburban lighting, airport lighting and communication.

NOW BRANDED WITH ORANGEBURG TRADEMARK

DISTRIBUTED BY

Graybar ELECTRIC COMPANY

LIGHT, EASY TO HANDLE

. . . and *more workable*. That's why Orangeburg Fibre Conduit is a big help in lowering transportation costs and speeding installation.

CUT AND WORKED ON JOB

Orangeburg can be cut with rough tooth hand saw — drilled or worked with ordinary hand-working tools.

Time Defying Materials

Unretouched photograph of Orangeburg material removed from ground after 41 years. Orangeburg withstands ground waters, acids, oils and alkalies.

MORE ORANGEBURG AVAILABLE

. . . at *more distribution* points through Graybar Electric Company and General Electric Supply Corporation.

ORANGEBURG KEEPS FORGING AHEAD

North, south, east and west Orangeburg Fibre Conduit *is* the first choice of leading utilities and municipalities, many contractors and practically all design engineers. Orangeburg innovated all the important advancements of the fibre conduit industry — another reason why it's the leader.

When the installation requires duct-banks of *four or more ducts*, ORANGEBURG STANDARD (Type 1) — installed *with* concrete encasement — is the *preferred* conduit.

JUST A TAP OR TWO

Tapered Sleeve Couplings save a lot of time for the Contractor. A few light taps on the coupling drive it firmly against the shoulder of the conduit. This makes a permanently tight, infiltration-proof joint.

Send for Bend Section Folder

Conduit-line transformation problems like this are greatly simplified by Orangeburg Bend Sections. Illustrated folder — showing various types of Orangeburg Bend Sections and Angle Couplings, their specifications, advantages and applications — sent FREE on request. Write today to Dept. EW-10 Orangeburg Manufacturing Co., Inc., Orangeburg, N. Y.

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GENERAL ELECTRIC SUPPLY CORPORATION

ORANGEBURG MANUFACTURING CO., INC., ORANGEBURG, NEW YORK

Study Your INSTALLATION ECONOMY
DUNCAN TYPE D
Brass Aluminum
MOST ECONOMICAL SOCKET FOR USE WITH SERVICE CABLE.
CABLE CONNECTOR — Finest, water-tight connector — makes a superior weatherproof installation.
TYPE D — Particularly applicable in areas using principally service cable — may also be used with conduit.
List Price $2.80
DUNCAN TYPE H.D.
HEAVY DUTY METER MOUNTING DEVICE
DUNCAN TYPE C
Die Cast Aluminum
THE SOCKET FOR CONDUIT
TYPE C — Provided with threaded hubs for conduit — adaptable to service cable installations.
List Price $3.00
TYPE HD — Eliminates current transformers in the range between 100 and 200 Amps. Use self-contained 4 or 5 terminal meters for services to 300 Amp. capacity.
List Price $26.00
DUNCAN
DUNCAN ELECTRIC MFG. CO.
LAFAYETTE, INDIANA

IT'S NEW!
IT'S IMPROVED!
IT'S DUAL-PURPOSE!
HYDRO-THERM — 250 000 CM-RW 60 C or RH 75 C-600 V
Listed by Underwriters' Laboratories as
TYPE RH-75°C
or
TYPE RW-60°C
PARANITE HYDRO-THERM
BUILDING WIRE
● Paranite Hydro-Therm combines in a single wire the heat-resistant qualities of Type RH and the moisture-resistant qualities of Type RW.
USED IN DRY LOCATIONS Paranite Hydro-Therm carries more current per dollar of cost. The higher amperage rating for Type RH wire under the National Electrical Code provides greater current carrying capacity. You can use smaller conductors, smaller sizes of conduit; and lower your labor costs.
USED IN WET LOCATIONS Paranite Hydro-Therm is rated as Type RW wire for 60°C operation because of its excellent moisture-resistant qualities.
IF IT'S PARANITE IT'S RIGHT!
PARANITE WIRE AND CABLE
Division of ESSEX WIRE CORPORATION
FORT WAYNE 6, INDIANA
ELECTRICAL WIRES AND CABLES "BETTER THAN CODE REQUIRES"

NEWS ABOUT PEOPLE

● Zed E. Merrill has retired as president of Mountain States Power Co. because of ill health. Announcement was made at the company's headquarters in Albany, Ore., that A. W. Trimble, executive vice-president for the past year, is the new president. Merrill has become chairman of the board and will be concerned chiefly with company finances and be available for consultation in matters of operation and policy. He has been with the company for 27 years, holding various executive positions, including general manager and vice-president before his promotion to the presidency. Trimble has served with Mountain States for 20 years, first as accountant, then as assistant treasurer, and from 1942 to 1949 as vice-president and treasurer. He has been a member of the board of directors since 1945.

● E. F. (Perk) Perkins has been appointed acting northern regional manager of the Pacific Coast Electrical Assn., with headquarters in San Francisco. Perkins is widely known to the electrical industry in northern California with a background of 22 years in the industry. After 14 years in the domestic sales division of Pacific Gas and Electric Co., he became affiliated with the Wesix organization in 1936, where he remained until joining the armed services in 1941. Since leaving the service in 1948 with the rank of colonel in the Transportation Corps, he has been associated with C. A. Russell in the manufacturers' agency field. Perkins fills the vacancy created by the resignation of Dick Lazarus as northern regional manager for PCEA.

● C. S. Allen, former vice-president and general manager of A. O. Smith Electrical Mfg. Co., Los Angeles, has become general manager of the Star-Kimble Motor Division of Miehle Printing Press and Mfg. Co., Bloomfield, N. J. Before his association with A. O. Smith, Allen was with General Electric Co. for 16 years.

● William M. Carah, a former Sacramento Valley newspaperman, has assumed duties as acting regional information officer for the U. S. Bureau of Reclamation, on temporary detail from his post as public activities officer at Shasta Dam. In the new position he succeeds the late Max W. Stern in the bureau's Region 2 headquarters at Sacramento.

PECK

● LINE MATERIAL CO. has assigned ROY R. PECK as apparatus engineer for its West Coast division, which covers the states of California, Arizona and portions of Oregon and Nevada. Before joining L-M, Peck was with Southern California Edison Co., apparatus and protective equipment division.

● J. R. DAVIS, former Pacific District supervisor with headquarters in San Francisco for the appliance and merchandise department of General Electric, has been appointed assistant supervisor of the field service section, product service division of G-E's appliance and merchandise department, with headquarters at Bridgeport. Davis attended the University of California in Los Angeles. He worked with GESCO in Los Angeles from 1930-35, and the following six years was with one of G-E's major appliance distributors in southern California and Arizona. He came to the San Francisco office in 1941 as warehouse manager at the appliance service center.

● CHARLES A. DOSTAL, who retired recently as vice-president in charge of sales for the Pacific Coast district of Westinghouse, has opened his own office in San Francisco as a consultant for management guidance in sales, distribution and merchandising. His new headquarters are located at Suite 811, Stock Exchange Bldg.

● MICHAEL I. O'CONNELL has been appointed mid-Western manager of ELECTRICAL WEST with headquarters in Chicago. He succeeds PHILLIP S. GRIFFIN, who has resigned. O'Connell is a graduate of Loyola University (Chicago) and was an air corps sergeant during World War II. He has been engaged in industrial publishing sales work since 1945, the last two and a half years with McGraw-Hill Catalog Division.

● FRANK A. BANKS, district manager of the Bureau of Reclamation's Columbia Basin project and the bureau's oldest employee in years of active service, will retire Sept. 29 after 44 years of government service. He is most widely known as the builder of Grand Coulee Dam. Banks will continue as a member of the Columbia Basin Advisory Committee and as representative of the United States on the Columbia River Engineering Committee of the International Boundary Committee. He will also continue to work out relationships of the Bureau of Reclamation with various state and other agencies on the Columbia Basin project.

● T. T. KENNEDY, who has been Los Angeles district manager of the Okonite Co. since 1928, effective Nov. 1 will acquire the new title of special representative. As such he will act in a consulting capacity and be free of administrative duties to perform special assignments. At the same time, EDWARD DANIELSON, district engineer for Okonite in San Francisco, has been appointed Los Angeles district manager, and as such will be in charge of sales and administration.

● C. A. MORRISON, who has been manager of the district office of Canadian General Electric Co. at Vancouver for the past three years, has become assistant to the president of the company. Morrison has left to assume his new duties in Toronto.

● CHARLES P. CULBERT, vice-president of Sues, Young & Brown Inc., Los Angeles, recently returned from an eastern trip where he visited the major SYB suppliers in New York, Philadelphia, Chicago, Ripon and Duluth.

● AB MARTIN, Bay Area manager of manufacturing for General Electric's apparatus department, has left Oakland to assume new duties as assistant manager of the company's Fort Wayne, Ind., Works.

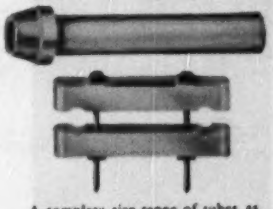
● JOHN SALONEN has been made supply sales manager of General Electrict Supply Corp. in Oakland. He has been associated with the company for ten years.

● GEORGE R. SOMMERS, formerly Pacific Coast sales director for Sylvania, who moved to the company headquarters office in New York a year ago, has been appointed general sales manager of Sylvania radio tube and television picture tube division.

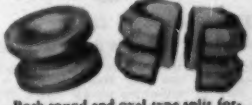
...and for
LOW VOLTAGE TOO!
call
Porcelain Products

Dense, good looking, positive gripping ALLIGATOR Nail Knobs are preferred by electricians insisting on workman-like installations to build good-will and repeat business.

Outlet boxes with Adjustable Metal Mounting lugs and set of Hangers are nationally famous for durability, ease of installation and safety features.

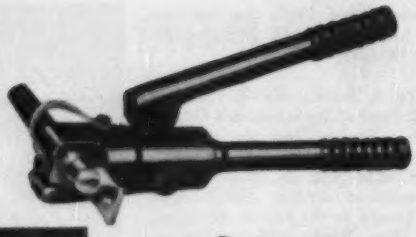


A complete size range of tubes as well as 2 and 3 wire closts are available for immediate delivery. Made precisely to give long and satisfactory performance.



Both round and oval type split for easy insulators as well as telephone insulators are available for immediate delivery.

SEND YOUR INQUIRY TO
Porcelain Products, Inc.
FINDLAY, OHIO



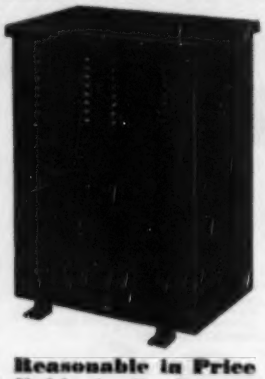
9 pound HYPRESS exerts 9 ton pressure

19 inches long, light weight, handy to operate, this fully insulated hydraulic Hypress (Y34A) delivers up to 18,000 pounds of pressure with automatically controlled depth of indentation. Assures strong, efficient electrical connections every time.

BURNDY
ELECTRICAL CONNECTORS

Burndy • New York 54, N.Y.; Burndy Canada Ltd., Toronto 8, Ont.; Western Branch: Vernon 58, Cal.

ECONOMICAL
Jeffries Transformers



Reasonable in Price
Reliable in Performance

Jeffries large transformers are priced reasonably—and you can save their first cost in a short time by minimizing current losses. When you use a Jeffries transformer, you can provide voltage change at the point desired, without prohibitive expense.

We supply all types and sizes. If not in stock, we build to order in a hurry—a week to 10 days.

Write today for catalog.

JEFFRIES TRANSFORMER COMPANY
1710 E. 52th St. Los Angeles 11, Calif.

E-M Service Masts are the perfect support for service wires on ranch type houses and low commercial structures that do not provide sufficient ground clearance to comply with National Electrical Code requirements (2322 a. & b. 1947).

E-M Service Masts are neat rugged units that require no guy wires. They look good, are hot galvanized to last a lifetime. Developed in cooperation with utility engineers and electrical contractors.

WRITE FOR BULLETIN 51

Electrical Manufacturing Co.
Pole Line Hardware
153 Angell St., BATTLE CREEK, MICH.

● At Its Annual meeting in Denver on Sept. 11 Rocky Mountain Chapter, National Electrical Contractors Assn., elected Dale Strohminger as its new president; Karl Krummel, retiring president, as vice-president; Bert Stiles, treasurer. Charles Simpson was elected to represent the chapter on the National Board of Governors. Ralph Johnson was nominated for the post of vice-president of District 8, succeeding J. E. Collier. Others elected to the directorate are Dave Sturgeon, Gene Snowden, Lon Rider, Herman Band, Harald Larsen and Sam Hawkins.

● E. H. Tarrant and R. W. Racine, recent electrical engineering graduates from the University of British Columbia, have been appointed sales representatives for the industrial division of B. C. Electric Railway Co. Tarrant will work out of New Westminster and cover the Fraser Valley area. Racine will work out of Abbotsford and cover the upper section of the Fraser Valley area.

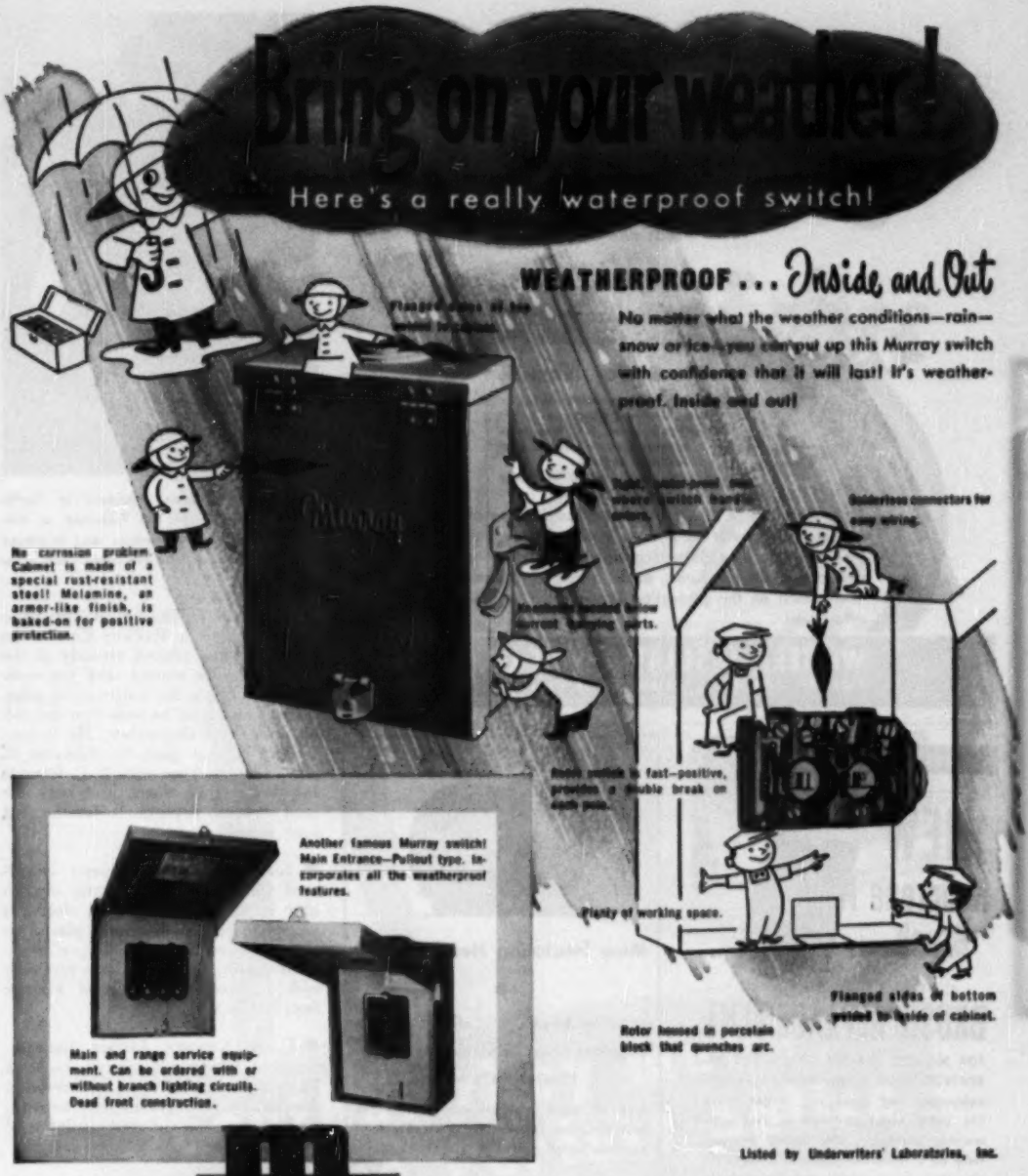
● John C. Denison, credit manager of Canadian General Electric, Vancouver, has been elected president of the B. C. division, Canadian Credit Men's Trust Assn. Others associated with the electrical and appliance industry who were named on the board of directors were W. R. Belfry, Canadian Fairbanks-Morse Co.; Frank Smith, McKenzie White & Dunsmuir Ltd.

● William U. Dent is the new far Western electronics sales representative for Westinghouse. With headquarters in San Francisco, Dent will have charge of the sale of marine radar, railroad and broadcasting radio, industrial radio frequency heating generators and other electronics equipment. His territory comprises five far Western and Southwestern states and Hawaii.

● Professors Robert A. Helliwell and Laurence A. Manning, Stanford electrical engineers, have left for Zurich, Switzerland, to attend a two-week general assembly of the International Scientific Radio Union. Both scientists will deliver a research paper at the assembly.

● Ed S. Winlund was recently appointed electronics sales representative for the Pacific Northwest, with headquarters at Seattle.

● W. H. Clagett Jr., after serving 14 years with the Bureau of Reclamation at Grand Coulee Dam in eastern Washington, has been transferred to the chief engineer's office of the bureau at Denver.


Bring on your weather!
Here's a really waterproof switch!
WEATHERPROOF . . . Inside and Out
No matter what the weather conditions—rain—snow or ice—you can put up this Murray switch with confidence that it will last! It's weatherproof. Inside and out!
Flanged sides of box extend to outside
Rigid, gasket-sealed door covers switch handle when closed.
Guideless connectors for easy wiring.
No corrosion problem. Cabinet is made of a special rust-resistant steel! Melamine, an armor-like finish, is baked-on for positive protection.
Insulating barrier below current carrying parts.
Knife switch is fast—positive, provides a double break on each pole.
Another famous Murray switch! Main Entrance—Pullout type. Incorporates all the weatherproof features.
Plenty of working space.
Flanged sides of bottom sealed to inside of cabinet.
Rotor housed in porcelain block that quenches arc.
Main and range service equipment. Can be ordered with or without branch lighting circuits. Dead front construction.
Listed by Underwriters' Laboratories, Inc.
Murray®
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1250 ATLANTIC AVENUE • BROOKLYN 16, N. Y.
Electrical Safety Devices For Home and Industry

BRONCO 60
Certified
Cords and Cables
with the
60% Neoprene Jacket
WESTERN
NEOPRENE CERTIFIED 2 COND
Positive 3 Way Protection
• a jacket that contains 60% by weight of new Neoprene
• certification of the Neoprene content by a registered, professional engineer
• cords and cables that are branded "Certified"
Only with Bronco 60 Certified can you be sure of longer life, greater safety, more economical performance . . . cords and cables that are more resistant to oils, chemicals, acids, cutting and abrasions. Insist on the protection Bronco 60 Certified offers you.
WESTERN INSULATED WIRE CO.
2425 EAST 30TH ST. • LOS ANGELES 58, CALIFORNIA

Joseph S. Thompson, president of Pacific Electric Mfg. Corp., San Francisco, at controls of earth moving machine used in ground breaking ceremonies for new Santa Clara plant

● Tom Lundy, chief load dispatcher for B. C. Electric Railway Co. for the past 38 years, retired recently at the age of 65. He started with the company in 1909 in the construction gang. Three years later he took over the job of chief load dispatcher. He is succeeded in that post by Edmund F. Key, who has been with B. C. Electric for the past 35 years, and with the load dispatch department for the past four years.

● John L. Busey, formerly associated with a General Electric distributor in the West, has been elected a vice-president of G-E and placed in charge of marketing policy, a newly created post. Busey has been president and a director of General Electric Supply Corp.

● C. A. Khantz, former manager-engineer of the Municipal Light & Power Department of Petersburg, Alaska, has become outside superintendent for Sitka Public Utilities of Sitka, Alaska.

● Because of the illness of Frank R. Sherwood, manager of purchases and stores for Pacific Gas and Electric Co., Frank E. Baxter has been appointed acting manager of purchases and stores.

● Richard L. Gray, formerly president and general manager of Kistler's Radar Sandwiches Inc., California, has become divisional manager of NESCO rubber goods division, Milwaukee, Wis.

ANSWERS VIBRATION
HELWIG SPEER
NEW
Neoprene
Brush
cuts
BRUSH REPLACEMENT
FOR MOTORS SUBJECT TO OUTSIDE VIBRATION, here's a new Helwig-Speer development that gives you longer brush life, better motor performance, less commutator grinding. The spring hammer rides on a Neoprene pad that absorbs all vibration, saves spring fatigue, reduces sparking. Write for new Catalog 93. Or call your nearest Helwig office.
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Seattle.....166 Jackson St.; Elliot 7133
Portland.....711 NW Everett St.; Beacon 3368
Los Angeles.....611 W. Pico Blvd.; Prospect 8281
Denver.....1660 Blake St.; Cherry 4425
Salt Lake City.....334 P. St.; Tel. 3-1600
HELWIG CO. Carbon Products
Makers of Mobilites and Transite Brushes

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And all types of mica combination for your electrical requirements—sheet, tubes, and fabricated parts.
MANUFACTURED BY
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DISTRIBUTED BY
ELECTRICAL SPECIALTY CO.
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LOS ANGELES 418 E. Third St.
SEATTLE 2406 First Ave. So.
DENVER 1015 Twenty-first St.

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Nicopress TOOLS
Nicopress SLEEVES

Together they make the Perfect Splice

The National Telephone Supply Company

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Canadian Mfr.—H. BLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

Nicopress is the Registered Trade Mark of The National Telephone Supply Company

● KARL MCGOWAN has been advanced to the position of district manager for the Blythe District of California Electric Power Co. He succeeds JOE E. KING, who has been transferred to the general office in Riverside to take over special duties. McGowan has been serving as assistant district manager since last September.

● E. V. ALDRIDGE, formerly associated with Allied Industries, Los Angeles manufacturers' representatives, has joined Appleton Electric Co. as district manager in Los Angeles. Aldridge started in the electrical industry in 1930 with Westinghouse Electric Supply Co., Los Angeles, working there for more than 16 years.

● WESTINGHOUSE ELECTRIC SUPPLY Co. announces the appointment of GORDON WRIGHT as radio and television sales manager of its Vernon, Calif., branch. He will be responsible for the sale and promotion of all radio and television receivers in the southern California area.

● TWO VETERAN EMPLOYEES of B. C. Electric Railway Co. have been named to head sections of the purchasing department. ARTHUR H. GRIFFITHS has become disposal agent, a new position, and A. RUSSELL HENSHALL was made buying supervisor.

● JOHN E. BARBER has been elected treasurer of Columbia Steel Co., succeeding E. H. DANIEL, who retired on Sept. 1. Barber has been vice-president of Consolidated Western Steel Corp., a subsidiary of U. S. Steel, at Los Angeles.

● DONALD R. STONE, formerly district manager for Philco in the northern California area, has become Pittsburgh regional manager of the home appliance division of the Murray Corp. of America.

● FREDERICK C. SCHLEMMER, who resigned recently as manager of the Hanford Works of the Atomic Energy Commission at Richland, Wash., has been appointed manager of construction of Burns and Roe Inc., engineers and constructors of New York City.

● C. E. KIRKPATRICK, former San Francisco district lamp and lighting manager for Graybar, has become Cleveland district manager for the company. Since 1948 he has been manager of Graybar's Memphis branch.

● F. RAY FRIENDLY has been elected a director and comptroller of Geneva Steel Co. and Columbia Iron Mining Co., subsidiaries of United States Steel Corp. Friendly succeeds C. B. VERNOOY in these positions.

Dana O. Egbert, recently transferred by Westinghouse Electric Supply to San Francisco as industrial sales representative there

● JAMES P. CUMMINGS, for many years with the Schwabacher Hardware Co., Seattle, has retired. Long associated with the housewares and electrical business, he is a charter member and one of the organizers of the Pot and Kettle Club of Seattle, and in 1947 and 1948 was president of the Associated Pot and Kettle Clubs. He is also a charter member of the Electric Club of Washington.

● STUART A. CUNDIFF, engineer for California Electric Power Co., who conducted the first commercial application of cloud nucleation as a power resource development, has called upon the federal government to regulate rainmaking activities. He said a federal agency is needed to issue licenses and conduct research.

● WILLIAM C. WALSH of General Electric's electronics department has been named Western regional sales manager for the company's replacement tube sales organization. He will be responsible for replacement tube sales west of the Rocky Mountains and the Territory of Hawaii. His offices will be located in San Francisco.

● FRED YATES, senior executive of B. C. Electric Railway Co. at New Westminster, B. C., has been elected president of the New Westminster Community Chest for the current year.

● A. NORMAN MURRAY has become regional planning engineer of the Bureau of Reclamation, with offices at Sacramento. He fills a vacancy created by the retirement of STANLEY A. KERR.

● SIDNEY L. MCLEAN is the new tax supervisor of Columbia Steel Co., succeeding BYRON SHELTON, who was recently transferred to the tax staff of United States Steel at New York.

● R. T. REDFIELD, Graybar Electric Co., is newly elected president of the Bureau of Home Appliances of San Diego (formerly called Bureau of Radio & Electrical Appliances). First vice-president is Gordon Dawson, Dawson & Co.; second vice-president, George Stoltenberg, Stoltenberg's Appliances; treasurer, Sam L. Hall, Electric Supplies Distributing Co. J. F. Zwiener of Zwiener Electrical Co. is immediate past president.

● L. DEAN FOWLER, former sales manager for General Electric's San Jose motor divisions, has become manager of sales for the company's control divisions located at Schenectady, N. Y.

● J. GRAYSON JONES, former chief engineer of Conrac Inc., Glendora, Calif., has been elected vice-president of the company.

Deaths

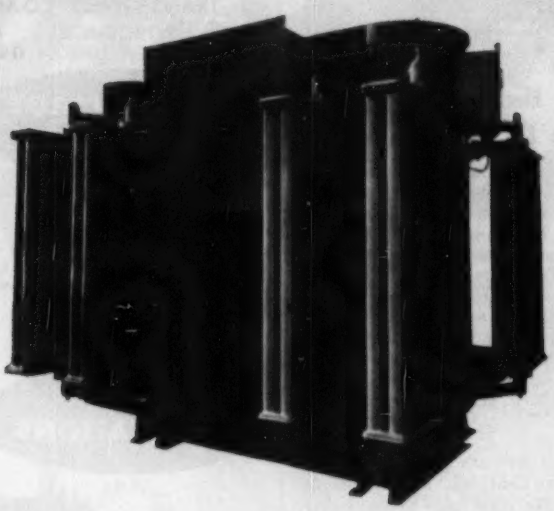
● FRANK SAWFORD, retired consulting mechanical and electrical engineer, died at Vancouver, B. C., recently at the age of 75. In 1911 Mr. Sawford joined Canadian Collier at Victoria as chief mechanical and electrical engineer. He moved to Vancouver in 1918 as chief engineer for Taylor Engineering Co. He was a former president of the Association of Professional Engineers of B. C., chairman of the Vancouver Board of Trade Engineering Bureau in 1928, and a life member of ASME and AIEE.

● R. M. NANCE, chief, branch of finance and accounts for Bonneville Power Administration, died at Portland, Ore., recently at the age of 46. He joined the agency in 1938 as senior accountant, later headed the accounts section, and was promoted in 1946.

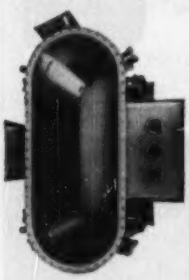
● MAX STERN, 66, regional information officer at Sacramento for the Bureau of Reclamation, died recently while vacationing at Echo Lake, Calif. He was formerly director of information of the Social Security Board in Washington for six years, and had spent several years as Washington correspondent for Scripps-Howard.

● CHARLES E. FORSYTH, 42, manager of the Forsyth Electric Co. of Seattle, Wash., died Aug. 29 at Seattle. He had managed the company since the death in 1932 of his father, Albert E. Forsyth, founder of the company.

How KUHLMAN has YOU in mind in building Power Transformers

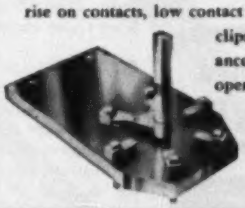


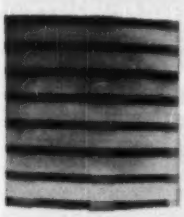
Kuhlman Power Transformers are not merely built — they are engineered! Kuhlman has had 55 years experience designing and building power transformers to meet the requirements of utility and industrial customers. These transformers have earned a high reputation for efficiency and reliability through the use of Kuhlman's proved and accepted design principles. Below is a revealing look inside a Kuhlman Power Transformer.



Rigid sturdy construction: Structural steel clamps hold the core securely — prevent shifting and vibration, provide support for coil braces, and center the transformer in the tank. The tank itself is made of heavy steel plate with all seams electrically welded and has a thoroughly protected surface. All bushing bosses and openings have smooth gasket surfaces and provision for external bolts.

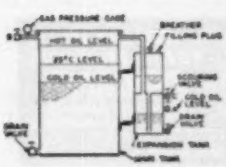
A typical result of the constant search by Kuhlman engineers for new materials, new designs, and new manufacturing methods is the new Kuhlman tap changer. This tap changer features high overload capacity at low temperature rise on contacts, low contact resistance, self-aligning spring clips on rotary blades, ample clearance at all points of voltage stress, operation by an external handle, and a plainly marked dial which assures locking handle in desired position with the handle locked by pin.





Thorough Protection: Kuhlman coils below 25 KV are assembled, dried under heat and vacuum, immersed in a thermo-setting, polymerizing-type varnish, and then baked. For voltages above 25 KV, varnish treatment is replaced by oil impregnation under vacuum. Kuhlman maintains a complete testing laboratory equipped to make every conceivable test on power transformers in accordance with E.E.I. NEMA standards.

More detailed information on Kuhlman Power Transformers may be had by writing for the new Bulletin CS-601. Kuhlman also manufactures a complete line of Distribution, Dry Type, Street Lighting, and Specialty Transformers. Bulletins on any type of Kuhlman Transformer are available on request.



Gas-oil-seal tanks are standard on transformers above 2000 KVA, voltages above 46 KV and optional on other ratings at no extra cost. In this system, an auxiliary tank is divided into two compartments containing oil and allowing expansion and contraction of the gas in the transformer tank under all conditions of loading and temperature.

EXPERIENCE COUNTS — THIS IS OUR 56TH YEAR

Kuhlman

KUHLMAN ELECTRIC COMPANY
BAY CITY, MICHIGAN

EXPORT REPRESENTATIVES: *International Standard Electric Corporation,* **67 Broad Street, New York 4, N.Y. Cable Address, Microphone, N.Y.**

STEEL STRAND

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ALL the strength and durability inherent in steel are combined—with definite economies—in Crapo Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous Crapo Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of Crapo Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

EVERSTICK ANCHORS

For new construction and maintenance—Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resilient, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

NOTES ON THE TRADE

Gregory Electric Moving Plant to Los Angeles

The Gregory Electric Co. has closed its San Diego transformer manufacturing plant and will move to one of two locations it owns in Los Angeles.

The manufacturer moved its plant to San Diego from Chicago a little more than a year ago. It employed 50 persons. General manager at San Diego was Tom Pass, a son of Joseph Pass, owner of the business.

Headquarters of Gregory Electric are at 2530 E. Washington Blvd., Los Angeles.

● EARL R. STRADER has been appointed northern California sales representative for the General Electric Lamp Department, according to Frank M. Falge, Pacific district sales manager. Strader was graduated from the University of California in 1948. He served in the Navy from 1942 to 1946.

● R. J. BLACKINTON has been named resin application engineer of G-E's West Coast chemicals division.

● MINNEAPOLIS-HONEYWELL REGULATOR CO. has announced the appointment of CHARLES F. WOODS to valve division sales manager for the Southwest region, with headquarters at Dallas; EDWARD J. BYRNE, formerly with the company's Houston branch, becomes industrial manager of the Dallas branch. Additions to the field sales staffs include WILLIAM J. KIRBY to Los Angeles and P. R. VOGEL to Houston on industrial supplies sales.

● KUHLMAN ELECTRIC CO., Bay City, Mich., has appointed Shaffer and Nelson Co., Seattle and Spokane, as new sales representatives for its complete line of transformers. Located at 312 Occidental Ave., Seattle, and 824 Realty Bldg., Spokane, Shaffer and Nelson will handle sales in the state of Washington and panhandle section of Idaho.

● GENERAL ELECTRIC SUPPLY CORP., Oakland, has moved into its new office and warehouse at 53rd and Hollis streets in Emeryville. The new facilities provide ample parking space, enlarged counter facilities, sufficient warehouse space to carry complete stocks, an auditorium and fully equipped display rooms.

Pennsylvania TRANSFORMER CO.
INTRODUCES ITS NEW LINE OF

STEP VOLTAGE REGULATORS

20.8 Kva, 2400 Volts through 750 Kva, 13,800 Volts

UNIT SUBSTATIONS

1000 Kva through 3000 Kva, 12,000 Volts through 34,500 Volts Primary

write your PENNSYLVANIA representative for Bulletin No. 2500

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800 S. Highland Avenue, Los Angeles
VAndike 5533

GEO. E. HONN CO.
420 Market Street, San Francisco
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ALWAYS SPECIFY THE BEST
WHITER THAN WHITE
ABOLITE Lighting
• Industrial
• Commercial Floodlighting
• Pump-Island Installations
The JONES METAL PRODUCTS CO.
WEST LAFAYETTE, OHIO
Sold Exclusively through Electrical Wholesalers

MOTORS, GENERATORS, TRANSFORMERS

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Bought and Sold New and Rebuilt
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.
Write For Free 1950 Catalog

Utica Lubring Pliers..

with built-in lubrication

Also available with splicing grooves (No. 259S)

LINEMEN SAY—"FINEST PLIERS WE'VE EVER USED."

Utica patented LUBRING pliers have a ring of oil-impregnated porous iron in the joint. This ring feeds lubrication to assure a smooth, free working joint.

Any lineman will like the heft, the feel and the rugged power that are built into Utica pliers. Management likes the economy of the long, long service they give.

Ask your tool supplier for information regarding LUBRING and other Utica Pliers—or write direct to

UTICA DROP FORGE & TOOL CORPORATION · Utica 4, New York

It pays to use U TI CA quality tools

AND THE WORLD'S BEST TOOLS ARE MADE IN U. S. A.

● GRAYBAR ELECTRIC Co. hosted some 600 local customers during its recent three-day open house for its new office, warehouse and display room at 1702 Cullen Blvd., Houston. Mrs. Barbara Gray King, great-granddaughter of one of the company's co-founders, acted as hostess and guest of honor for the celebration. The new offices are air conditioned. Illumination is furnished by Day Brite recessed lighting fixtures with special Holophane lens. The display room, 21x36 ft., features a Hotpoint all-electric kitchen, a lighting fixture display of the products of the company's suppliers, small appliance and television displays. With 35,000 sq. ft. of storage area, the warehouse is arranged so that a tow-truck may operate in any aisle. There are separate docks for loading and shipping. The city sales counter is conveniently located next to the customer's parking lot.

● MCLENNAN, MCFEELY & PRIOR Ltd., operating wholesale, hardware, furniture, electrical and allied warehouses and retail stores throughout British Columbia, has been sold to the J. H. Ashdown Hardware Co. of Winnipeg. H. C. ASHDOWN is president of the Winnipeg company. There will be no change in the operation of the organization, and trading will continue under the name of Mc & Mc in British Columbia.

● HALLIDAY ELECTRIC, New Westminster, B. C., has installed the lighting fixtures, wiring and ultraviolet lamps for the remodeled King Edward Cafe in New Westminster. Acme Refrigeration & Appliances handled the refrigeration installation.

● W. B. BAKER & Co. Inc., electrical, heating, ventilating and sheet metal contractors in San Francisco, have moved to 1375 Fitzgerald Ave. They were formerly located at 1110-1112 Mission St.

● DALEY ELECTRIC Co., Phoenix, has become a dealer for Allis-Chalmers motors and controls and a certified service shop for the company's motors, controls and transformers in Arizona and 13 counties in New Mexico.

● FLORENCE STOVE Co. has named the Walter B. Lloyd Co. Inc., Salt Lake City, as distributor in the Intermountain States area, according to Richard D. Nugent, Florence's Western division manager.

● INTERNATIONAL REGISTER Co., Chicago, manufacturers of Inter-Matic time switches, has appointed the E. T. VONIER Co., Denver, as a representative in that area, and ABBOTT ELECTRIC Co., Seattle, as a new service station for its products.

PAUL JUSSEL is proud of the new building he built early this year at 2611 W. 6th in a growing industrial section of Denver. He was president of Rocky Mountain Chapter, NECA, last year and is still its governor

● FORSTS Ltd. is erecting a new branch of its electrical appliance, radio and furniture chain at the southeast corner of Third and Lonsdale, North Vancouver, B. C. The new store will be under the management of A. REID and will have more than double the space of the former North Vancouver branch of the company.

● GORDON H. PROFFITT has become sales representative for the Nickel Cadmium Battery Corp. With offices in San Francisco he will serve all markets for Nicad storage batteries including railway diesel locomotive starting, marine, utility and highway truck and bus services.

● RICKETTS-SEWELL ELECTRIC Ltd., Vancouver, B. C., has become distributor in British Columbia for the British Insulated Callender Cable Co., which has developed an electric heating system known as the Panelec.

● DUMONT has named Smith-Morley Co., Salt Lake City, as exclusive distributor of DuMont TV receivers in the Salt Lake City area.

● THOMAS BELL has been appointed general manager of the Philco division of Gough Industries, Los Angeles. He was formerly refrigeration sales manager for the firm, and is succeeded in that position by CY YOUNGERMAN.

● SKF INDUSTRIES Inc. has established an 11-state sales region to expedite future requirements of Western industries for ball and roller bearings. J. C. Bowman, district manager at San Francisco since 1936, has been appointed regional manager. The new region, with headquarters in San Francisco, will include territory now serviced by district offices in that city, Los Angeles and Portland and by the Denver branch office. This comprises the states of Washington, Oregon, California, Idaho, Utah, Wyoming, Montana, Colorado, Arizona, New Mexico, western Nebraska and the city of El Paso, Tex.

● REX N. ANDERSON, Salt Lake City, has been named manager of the mining section for the Pacific Coast district, Westinghouse Electric Corp. He has long been associated with the mining industry throughout the West. In his new post Anderson will have charge of the sale of Westinghouse electrical apparatus to the mining and related industries in an area comprising all or parts of nine Western states and Alaska.

● GEORGE W. SWENY, president of Neon Products of Western Canada Ltd., announces the appointment of H. D. CLEVELAND as vice-president of the company and its subsidiary, Seaboard Advertising Co. Ltd. COLIN T. MARTIN has become managing director of Neon Products, and N. H. FINLAYSON Jr. will succeed Cleveland as managing director of Seaboard. W. D. DIX has been appointed sales manager of Neon.

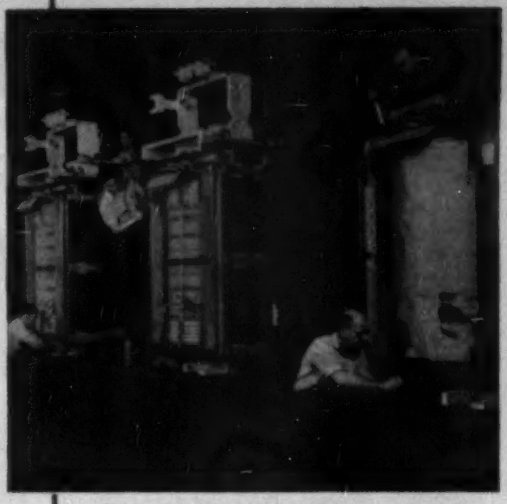
● CANADIAN WIRE & CABLE Co. Ltd., has taken over a new warehouse at 1494 Powell St., Vancouver, B. C. Enlarged facilities will permit the handling of larger stocks of cable and steel wire rope.

● WOOD & CIES DISTRIBUTING Co., Los Angeles, has been appointed distributor for Steelman Phonograph & Radio Co. Inc., New York. It will cover eleven Western states as factory representatives and will distribute Steelman in California.

● KELVINATOR DIVISION of Nash-Kelvinator Corp. announces the appointment of R. B. Trick as manager of its Seattle zone. He was former freezer sales manager at the corporation's Detroit headquarters.

● ABBETT ELECTRIC CORP., San Francisco contractor, has moved its office and warehouse to 85 Federal St. in the city.

Saved! $1950.00 and 10 weeks on 2 transformers



*Here's an RM (meaning "Repetitive Manufacture") assembly line. By using standardized construction methods, General Electric builds these RM power transformers more economically—delivers them faster. Listed RM ratings are available up to 10,000 kva and 69 kv, with many optional features. All RM transformers up to 2000 kva are produced with Spirakore® construction.

how RM* made this possible

The Customer's Specifications
- —Two, 3-phase transformers
- —1,000 kva each
- —High voltage: 22.9 kv
- —High voltage taps: two 2½% above and two 2½% below 22.9 kv
- —Low voltage: 5040/8720Y-volts with ±10% Automatic Load Ratio Control
- —Impedance: 6%
- —Oil preservation: Sealed tank
- —Special features: provision for future fans; self-contained power supply for LRC.

Our Quotation
Price—$26,516 net
Shipment—23 weeks

Our Alternate Quotation
on RM-standard transformers
Price—$24,566
Shipment—13 weeks

Here's a case where RM specifications matched the customer's original specifications, with only 2 minor variations: RM high-voltage taps were 24,100/23,500—22,300/21,700 (within ¼% of specified taps!). Also, the power supply for LRC was not self-contained—which actually proved preferable for this application.

Customer bought RM, saved nearly two thousand dollars—received faster delivery.

Before you buy your next small power transformer, investigate RM. If standardized transformers can fit your needs—*you, too, will save.*

Ask for catalog GEC-479. Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

401-12

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle and Richland, and Sales Offices in twenty Western cities.

GET THE MOST FROM YOUR WELL!

THROUGH SCIENTIFIC INTERMITTENT PUMPING

with TORKMASTER

UTILITY TIME SWITCH

With water tables running low everywhere, it is vital to get the most from every well. Precision control of efficient intermittent pumping is another of many important uses — indoors and out — of famous Tork devices for turning electrical circuits on and off. Write for full information and prices of complete line.

No. 948A $10.00 List

Carried in Stock by Most Electrical Jobbers

30 AMP • SINGLE POLE
TELECHRON MOTORED

TORK CLOCK CO., INC.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUIRED BY the Act of Congress of August 24, 1912, as Amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) of Electrical West, published Monthly at Los Angeles, Calif., for October 1, 1950.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, McGraw-Hill Company of California.....68 Post St., San Francisco 4, Calif.
Editor, George C. Tenney.....68 Post St., San Francisco 4, Calif.
Managing Editor .....None
Business Manager, John W. Otterson.....68 Post St., San Francisco 4, Calif.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

McGraw-Hill Company of California, 68 Post St., San Francisco 4, Calif.; McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York City; Curtis McGraw, 330 West 42nd St., New York City; George C. Tenney, 68 Post St., San Francisco 4, Calif.; John W. Otterson, 68 Post St., San Francisco 4, Calif.; N. A. Bowers, 68 Post St., San Francisco 4, Calif.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

GEORGE C. TENNEY, Editor.

Sworn to and subscribed before me this 28th day of September, 1950.

[SEAL] ELVA G. MARLIN.

Notary Public, State of New York, No. 30-7754500 Qualified in Nassau County. Certificates filed with New York County Clerk's and Register's Offices. (My commission expires March 30, 1952.)

Swiss Manufacturing Firm Incorporates at Seattle

The Pacific Oerlichon Co., a subsidiary of the Swiss electrical equipment manufacturing firm of Oerlichon, has been incorporated at Seattle, with authorized capital of $500,000.

Lloyd Morgan, Oerlichon representative at Seattle, said plans of the new company were uncertain but that it has been considering purchase of a waterfront plant in Tacoma. Plans could include either the manufacture of electrical equipment or service as an Oerlichon jobber in the Pacific Northwest, an area of growing hydroelectric development.

Oerlichon has done no business as yet in the Pacific Northwest but has sold some equipment in British Columbia, Morgan said. Should it become a U.S. manufacturer, it could bid for federal government contracts now closed to foreign firms.

Morgan has been serving at Seattle as representative of several European manufacturers.

Vancouver Firm Given Contract for Hydro Plant

Contract has been placed by the B. C. Power Commission with Dawson Wade and Co. of Vancouver for construction of the Clowhom Falls hydroelectric development at Sechelt, B.C. This is the first unit of the development and will produce 4,000 hp.

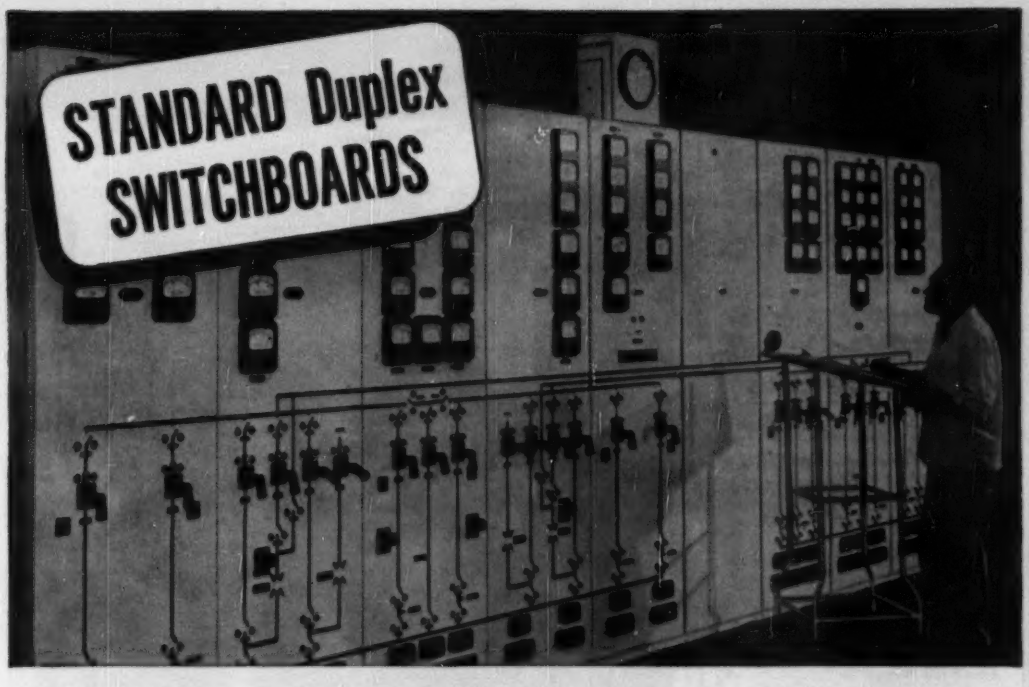
The company's bid provides for a "target price" of $203,000 plus a 10% contractor's fee. If the cost exceeds that amount the fee percentage is lowered.

● ERIC ACKLAND & ASSOCIATES Ltd., Vancouver, B. C., has been appointed representative in British Columbia and Alberta for Automatic Switch Co., Orange, N. J. J. R. TAIT will serve in the Alberta territory for the Ackland organization.

● C. P. CLARE & Co., Chicago relay manufacturers, has announced the advancement of L. E. NOELCK, formerly Western sales manager, to assistant sales manager.

● CORPUS CHRISTI ELECTRIC Co., Corpus Christi, Tex., has been appointed a dealer for Allis-Chalmers general machinery division.

● CAPITAL WHOLESALE ELECTRIC Co., 1235 S St., Sacramento, has incorporated with E. S. Bancroft as president, CLARK BAKER Jr., secretary.



Custom-Built To Your Needs!

ALLIS-CHALMERS switchboards combine both standardization and custom design advantages. Standard drawings, parts and procedures save time and material. Yet each switchboard is designed to fit *your* requirements.

FEATURES THAT SPEED SERVICING

Instruments are easy to read, controls are easy to reach. Instruments and control switches frequently used are mounted on the front panel. Protective relays, watthour meters and instruments not requiring frequent attention are mounted on the rear panel.

Front and rear panels are separated by a passage with doors at either end for fast inspection. Three way switches control interior illumination.

Metal troughs guide and protect wiring and make maintenance easy. Steel angles, plates and panels are chemically treated and spray-painted to make them corrosion resistant.

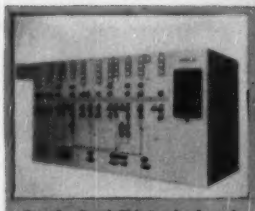
Factory assembled, wired and tested. Just bolt down and connect to incoming power lines.

For more information write for bulletin 18B6149A.

A-3129

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS



Standardized. This Duplex board, remotely controls 69 kv outdoor circuit breakers, has standard instruments and controls. Mimic bus identifies circuits.

Convenient. Large access doors at each end and well-illuminated interior permit easy inspection. Wiring troughs protect wiring. Terminal blocks are easy to get at.

Corrosion resistant. Switchboard parts conveyed through a hot phosphate tunnel are chemically treated and spray painted in a continuous process.

Low installation cost. Nine panel Duplex switchboard is easily handled as a unit. Just bolt down and connect to incoming cables. Little field work is necessary.

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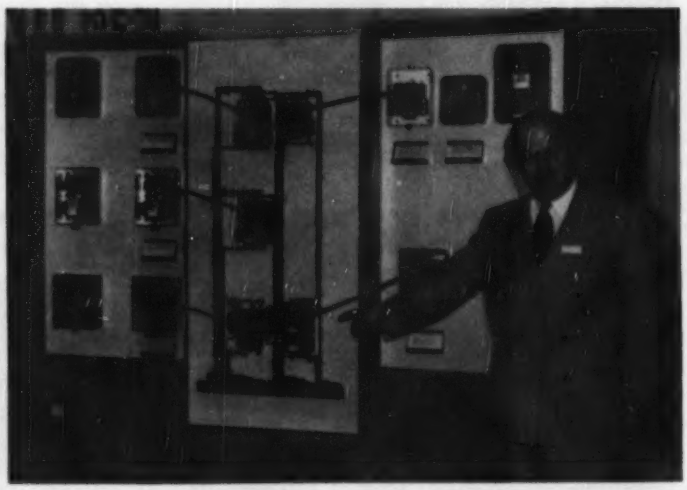
PROFILES

Officials and district managers of Holophane Co. at the recent IES national conference in Pasadena pictured left to right: Robert G. Dummel, San Francisco district manager; Frank van Gilluwe, Los Angeles district manager; Charles Franck, New York City, president; C. C. Keller, vice-president in charge of sales; S. R. Williams, vice-president in charge of street lighting; Paul Davis, Holophane Northwest district manager with headquarters at Seattle



Speaking for all the manufacturers of control equipment, not alone for his own Allen-Bradley Co. of Milwaukee (of which he is chief engineer), J. J. Mellon pointed out to the Northwestern and Southwestern sections of International Association of Electrical Inspectors, why all control assemblies cannot be submitted to Underwriters' for listing; but all components are

More business for you! **That's the aim of this ad—first in a new national campaign designed to bring Eastern industry to Northern California. It works for you by persuading businessmen to consider new plants and factories in your community. Watch for these ads in seven key magazines starting in September — *Time, Newsweek, U. S. News and World Report, Business Week, Forbes, Fortune and Wall Street Journal.***

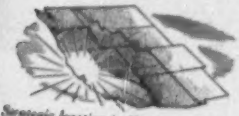
Farm income in California is over $3,000,000,000 a year.

Fine transportation to reach all the 11-state West.

Fastest-growing U. S. market—2.3 times national average.

Abundant resources nearby: lumber, metals, oil, clay, many others.

Healthy, happy living . . . plenty of room, sun . . . fine schools, recreation.



Strategic location in Northern California can put you on the very doorstep of this 20 billion dollar bonanza market.

You can best serve all the West from Northern California

If you're considering the West, consider carefully the advantages of strategically located Northern California. In the last ten years its population has jumped over 50% . . . its individual income is up 202% . . . its cash farm income has grown 217% . . . and the value added to the area's products by manufacturing has climbed fully 206% • P. G. and E.'s $800,000,000 postwar expansion program, largest in the nation, is nearing completion. By mid-1951 we'll have added nearly 2,000,000 h.p.—doubling prewar capacity—and we'll continue to build ahead of growing demands of the area. Rates are among the nation's lowest. Write to us for exclusive studies of industrial sites in this rich and still-growing area.

PG and E

Pacific Gas and Electric Company,
San Francisco, California

10AX-50

Will sales be served on a silver spoon in 195X?

ADEQUATE WIRING Certified

Experts predict continued rise in America's standard of living during the 50's. More Americans will be wanting more electrical appliances—among other things—and have the money to buy them.

But just money and willingness to buy will not be enough to satisfy the mass market for the millions of ironers, driers, TV sets, ranges, water heaters and other electric appliances we *can* sell. For the average home wiring job just won't take the electric load necessary to operate them.

The first and biggest job of the entire electrical industry is to sell the CERTIFIED ADEQUATE WIRING idea. It is the best insurance we can have against unnecessary loss of high-profit sales because of lack of adequate wiring.

PACIFIC COAST ELECTRICAL ASSOCIATION

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